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A CONSIDERATION OF RECENT ADVANCES IN MEDICAL SCIENCE IN THE LIGHT OF LORD LISTER'S STUDIES*

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FOR this honour of being chosen to give the sixth Listerian Oration I wish to express my very sincere appreciation to your committee and to you, the members of the Canadian Medical Association.

It is indeed a privilege to renew tribute to the Great Benefactor, but as I re-read the orations previously delivered before this Association by my eminent predecessors Stewart, Sherrington, Muir, Moynihan and your own native son, Archibald, my enjoyment of their discussion and their style was mingled with the apprehension that they had so thoroughly described the life and work of Lord Lister there was little left for me to say. However, his character was so great and his contributions to science and to humanity were so monumental that I am impelled to call your attention to some of the recent developments in the science of medicine and the art of surgery in the light of Lister's own ideas and observations.

As one reads and re-reads Lister's collected papers, especially those dealing with blood clotting, inflammation and repair, one is impressed with the soundness of his observations and the prophecy in many of them of future discoveries in the fields of anatomy, physiology, bacteriology and immunity and in the prevention and treatment of infection and present day repair of wounds—the subject that absorbed his entire professional life.

Lister's endowments were many, among them the traditions and strong constitution of hardy Quaker forebears, generous and solicitous but wise parents, a sound education acquired under masters in the classics and the sciences. The two most helpful influences in his life were the remarkably close companionship of a wise, scientifically trained father and the constant help and encouragement of an understanding, whimsical and charming wife.

It was his father who first instilled in him the scientific approach and stimulated that God-given discontent with current knowledge and method that characterized his adult years. Lister's tribute to his father[1] is equally applicable to the son,

> "The comprehensive grasp of his intellect and the extent and variety of his attainments were as remarkable as the accuracy and originality which characterized his microscopical work. His clear, calm judgment and strict integrity made his opinion highly valued in matters of difficulty and dispute."

Because of the father's interest in microscopy and his inventions and improvements in the development of the apochromatic lens the son was early trained in the accurate and methodical use of the microscope and the camera lucida. In the Third Huxley Lecture[2] he says,

> "My father, whose labours had raised the compound microscope from little better than a scientific toy to the powerful engine for investigation, had equipped me with a first-rate instrument of that kind, and I employed it with keen interest in verifying the details of histology brought before us by our great master."

He refers to Sharpey, the physiologist, who, with Graham, the chemist, left the greatest impress on Lister, the medical student in University College, and stimulated his interest in physiology and chemistry, so fruitful in his subsequent career as investigating surgeon in Edinburgh and Glasgow. It was this

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fundamental training and development of the searching mind that prepared Lister for his epoch-making studies in injury, inflammation and repair of tissues. His great inspirer and friend Pasteur once said, "In the field of observation chance only favours the mind that is prepared". It was the prepared mind that made it possible for Lister to leap that unmeasured gap between the frightful wound infections then occurring in all hospitals and the unknown etiological factor of contaminating virulent bacteria.

There were three characteristics of Lister's scientific mind that account for his success. The first was his discontent with traditional methods. He was constantly trying to improve his own technique. Witness his study of the protective dressings, preparation of suture material, in fact the daily effort to perfect the entire antiseptic principle. The second was his everlasting perseverance, which was the result of the first, his discontent with anything short of perfection. The third was his ability to reduce a problem to its simplest terms and to attack it by simple methods. This was perhaps best demonstrated in his studies of the early phases of inflammation,[3] one of the best, certainly the most important, of his early papers. In writing his father, in one of the few letters expressing pent-up thrill and enthusiasm for his accomplishment, he describes his experiments in inflammation with the transilluminated web of the frog's foot, and ascribes the success of the study, in his own words, "To results got by the very simplest possible experiments, neatly executed." These characteristics combined with his wide range of interests in chemistry, physiology, pathology and bacteriology developed in him a breadth of scientific view unique for a surgeon of his or any other day, and enabled him to attack the problem of infection from a detached and objective standpoint. This rare combination of scientific training, investigative temperament and protean interests resulted in his conceiving and initiating studies which only recently have been resumed with far-reaching promise. It is to some of these newer developments, along lines which Lister suggested and worked with, that I would call your attention.

In order to understand Lister's preoccupation in the problem of wound infection, it is essential to consider the conditions under which he began and acquired his early training in surgery. He entered University College in London in the spring of 1844. During his undergraduate days he began the study of surgery shortly after the discovery of anæsthesia. As a freshman he witnessed the first operation performed under ether by Robert Liston at University College Hospital in December, 1846. Freeing the patient from pain was until Lister's discovery the only gain from anæsthesia. Rough and rapid surgery continued to be the vogue, and as new fields opened up to the surgeon the calamity of infection increased. As Lister saw the horrors of inflammation and sepsis increasing with the broadening field of surgery the hazard of this form of therapy made an ever deepening impression on him. The uncertainty of the outcome of even simple operations in the hands of such masters as Liston and Symes, each using an individual technique of dressing the wound, intensified his desire to get at the cause of wound infection.

In his daily ward dressings, especially after he had gone to Glasgow, where the Infirmary received so many traumatic cases from the industrial and shipping districts, he became convinced that the one constant factor in wound infection was the access of air to the wound through the divided protecting skin. He was always comparing the benign healing in a simple fracture with the life-threatening hazard of the compounded fracture. This conviction, almost an obsession, that wound infection was due to air contamination, must be remembered in evaluating his long evolution of the antiseptic principle.

His interest in wound infection was also the result of his first-hand knowledge of inflammation. When first appointed as Assistant Surgeon to the Royal Infirmary in Edinburgh, under Syme, the responsibility of teaching the class of medical students electing his course weighed heavily on him. He departed from precedent when he decided to introduce his teaching with a series of lectures on inflammation based upon his own experiments and observations. How did he go about this experimental study? He chose to observe and record accurately the early phases of inflammation in the living animal by studying different kinds of irritation in the transilluminated tissues of the frog's web. These observations he published in 1858.[3] Lister very evidently appreciated the virtue of studying anatomical structure in the process of normal and abnormal functioning. This method had been used by Wharton Jones,

but Lister improved upon it by maintaining conditions of temperature and moisture normal for the frog. Subsequent advances in fixation, sectioning and staining of tissues by the German school of pathologists distracted the attention of morphologists from this method. In recent years, however, it has been actively revived, especially by anatomists and physiologists interested in angiogenesis and vital staining of the reticulo-endothelial system. The studies of such men as Krogh, Richards, Landis, Chambers, and the Clarks show what can be done with microscopic methods applied to living tissues and even the living cell. Lately Melvin Knisely, in the Hull Laboratory of the University of Chicago, has employed Lister's method of studying transilluminated tissue under proper conditions of constant temperature and moisture, but with improved methods of light transmission.

Knisely, in his modesty, and with the caution of a true investigator, makes few claims, and wisely so, but having twice visited his laboratory and observed his methods, both there and in our own laboratory, I am convinced that entirely new conceptions in the anatomy and physiology of some organs will be established by this newer technique of a method used by Joseph Lister in his early work in the study of inflammation.

BLOOD COAGULATION

Aside from its intrinsic interest to every surgeon, the phenomenon of blood clotting had attracted the attention of Lister the investigator when he was studying the early stages of inflammation. The fate of the blood clot in infected wounds associated with secondary hæmorrhage was a constant problem in his operative work. The subject was obscure, and even the studies of such able men as John Hunter, Hewson and Astley Cooper, and the later work of Richardson and Brücke did not explain the various phases of coagulation which he had observed in his laboratory and in his wards.

His studies in blood clotting began in 1858, and during the next five years he published four papers on the subject. The fourth and most important was the Croonian Lecture[4] delivered before the Royal Society of London in 1863. This gives the summary of his investigations. Many years later, in 1891, he addressed[5] the Medical Society of London, reviewing his own work in the light of later discoveries and stressed the practical application of these scientific contributions. These papers are particularly interesting because of the original and ingenious, yet simple, experiments which he made before any of our present concepts of blood coagulation were established by such men as Schmidt, Hammersten, Bordet, Howell and Wöhlich. In 1859 Lister completely disproved the prevailing ammonia theory of Richardson. He found that cold temperatures still inhibited coagulation, and this same blood could be made to clot rapidly by warming even though it had lost its ammonia. He also disproved the vital theory which had been held by many physiologists, including Sir Astley Cooper and Brücke. The inference drawn by these observers was that the living vessels exert an active influence in preventing coagulation of the blood.

In the Croonian Lecture Lister presented evidence which was of great value in confirming the work of Alexander Schmidt,[6] of Dorpat, who had shortly before discovered that blood corpuscles did not act as living cells but contained materials which greatly accelerated the coagulation of blood plasma, œdema fluid and hydrocele fluid. Schmidt also found that blood corpuscles resembled other "devitalized tissues" in this respect. Lister, in proving the above contention of Schmidt, showed that intact and living vessels had little effect in accelerating coagulation, whereas damaged vessels or dispersed foreign material greatly accelerated coagulation. Lister demonstrated that intravascular clotting was the result of "inflammation" or "devitalization" of blood vessels which caused blood corpuscles to acquire "adhesiveness" with resultant congestion and coagulation. Lister observed that blood in limbs amputated after severe trauma was much more apt to be coagulated than the blood in limbs removed for other causes.

Schmidt's work, early confirmed by Lister, has provided one of the basic principles of our present concept of blood coagulation. Schmidt called this material which he obtained from corpuscles and other tissues "fibrinoplastic substance", and he believed that the release of this substance by trauma to the solid constituents of the blood or inflammation of the blood vessels caused the blood to coagulate. It was not until 1877, sixteen years later, that Hayem[7] first described blood platelets or thrombocytes, and in 1882 Bizzozero[8] independently made the same discovery. These workers demonstrated that disintegration of platelets rather than

corpuscles preceded intravascular clotting. On the basis of this work it has generally been agreed that the disintegration of platelets furnishes something to the plasma which breaks down the existing equilibrium and precipitates the act of clotting. The chemical composition of the platelets includes a phospholipid of the nature of cephalin which appears to work as the active principle of thromboplastic material. Howell[9] believes that platelets are also a source of prothrombin. The first adequate chemical analysis of platelets was made in 1936 by Chargaff,[10] of the Department of Surgery of Columbia University. In addition to a cephalin fraction which proved to be a very potent activator of coagulation Chargaff was able to isolate an aqueous extract of defatted platelets which has a potent inhibitory effect on coagulation. It seems likely that platelets are extremely important in the maintenance of blood in the fluid state as well as being of importance in producing coagulation.

Aschoff[11] demonstrated pathologically the importance of platelet agglutination in the formation of intravascular clots, and recently Best[12] has shown by means of motion pictures and microphotography the actual structure of platelets and their agglutination *in vivo* as the initial action in the occurrence of intravascular coagulation. Platelets do not seem to differ essentially from other tissues in their chemical composition, but histologically they are extremely fragile and capable of liberating thromboplastic material with great ease in the presence of only slightly altered environmental conditions. Further chemical and biological studies are at present in progress at Columbia University, and it is hoped that these studies will lead to more exact isolation and knowledge of the nature of the "fibrinoplastic" or "thromboplastic" substance which was discovered by Schmidt and so interested Lister. Possibly the solution of such clinical problems as hæmophilia and purpura will be solved by this approach.

In the course of a study of the thromboplastic activity of phosphatides by McLean[13] in 1916 an accidental discovery of a potent inhibitor of blood clotting was found. This material was at first considered to be a heparphosphatide, but further study by Howell and Holt[14] revealed that it did not contain phosphorus but was of the nature of a polysaccharide. Because of the large amounts of this substance which they found in the liver after their material had been freed of cephalin they named it "heparin". Howell suggested that heparin might be of clinical value, but the likelihood of severe reactions and the toxicity of this material as prepared by Howell forbade its use. The much more recent work of Charles and Scott[15] and Jorpes[16] has provided a non-toxic potent preparation which is now available in pure form. This material has been demonstrated by Murray and Best[17] and Solandt and Best[18] and numerous other workers to be of tremendous value in the treatment of diseases characterized by intravascular clotting. Chargaff and Olson[19] in our laboratories have shown that the intravenous injection of protamine will quickly restore the clotting time to normal after it has been prolonged by means of heparin; thus excessive bleeding after heparinization can be controlled, should it occur (and it rarely does). Waters and collaborators[20] have recently used protamin as a means of detecting the presence of heparin in animals experiencing anaphylactic shock, and this experiment demonstrates that heparin is probably released into the blood stream as a physiological anti-coagulant under certain conditions.

Gordon Murray, in conjunction with C. H. Best,[17] has demonstrated that post-operative phlebitis and pulmonary infarction can be prevented by the routine use of heparin after operation. Also, the use of heparin after vascular surgery has practically eliminated the secondary clot formation which occurs with great frequency after surgical interference with the integrity of the vascular system. The value of the use of heparin in conditions such as acute phlebitis, pulmonary infarction, arterial embolus, coronary infarction, mesenteric thrombosis, thrombosis of the central vein of the eye and the disturbance following any form of vascular surgery seems well established.

Still more recent work in the field of blood coagulation has been concerned with the correction of states characterized by excessive bleeding. As early as 1929 Bancroft, Kugelmass and Stanley-Brown[21] stated that a bleeding tendency in obstructive jaundice could be predicted by determining the plasma clotting time which gives a rough estimate of the prothrombin present in the blood plasma. Later work by Quick and co-workers[22] and Warner, Brinkhaus and Smith[23] provided more accurate

methods for the determination of prothrombin. Dam and Schonheyder[24] in 1934 discovered an accessory food factor which they later named vitamin K. The absence of vitamin K in the diet of young chicks produced a marked bleeding diathesis and a low prothrombin level in the plasma. The addition of vitamin K to the diets of these chicks produced prompt recovery. Greaves and Schmidt[25] noted the similarity of the blood pattern in animals bleeding because of persistent biliary fistulæ and chicks suffering from a vitamin K deficiency, and they found that the addition of bile salts and large amounts of vitamin K corrected the bleeding tendency in these animals. They postulated that the bile salts were necessary for the conduction of vitamin K, which is fat-soluble, across the mucosa of the small intestine. Brinkhaus, Smith and Warner[26] were the first to demonstrate the beneficial effect of the feeding of bile salts and vitamin K to human beings suffering from obstructive jaundice and having a bleeding tendency because of a lack of prothrombin.

CHEMOTHERAPY

In the Third Huxley Lecture[2] Lister refers to his early work in the study of pyæmia, and speaks briefly of his effort to combat infection by chemotherapeutic measures. I quote this paragraph because of its significant bearing upon recent developments in the treatment of bacteriæmia and septicæmia.

> "While these investigations into the nature of pyæmia were proceeding, I was doing my utmost against that deadly scourge. Professor Polli, of Milan, having recommended the internal administration of sulphite of potash on account of its anti-putrescent properties, I gave that drug a very full trial as a prophylactic. I have notes of a case in 1864 in which, after amputating the thigh for disease of the knee joint, I gave ten grains of the sulphite every two hours from the time of the amputation; and when on the sixth day an ominous rigor occurred I doubled the frequency of the administration. Death took place, nevertheless, and this was by no means my only experience of such disappointment."

Thus we see that Lister had in mind the possibilities of a chemotherapeutic attack on surgical infections, or what he then called putrefaction. He was not the only one to experience disappointment, for during the past twenty years many futile attempts by many investigators with many different forms of chemicals, dyes, metallic solutions and bactericidal preparations were made in an effort to combat septicæmia and pyæmia.

Ehrlich, of course, succeeded in sterilizing the blood and tissues of syphilitic patients by the use of the 606 compound, salvarsan, and in combating many kinds of parasitic blood diseases by the use of arsenic derivatives. It was most fitting that, using the same thorough chemical methods, the German investigator Domagk and his associates of the I. G. Farbenindustrie of Eberfeld, should have discovered the anti-streptococcal activity of an azo-dye containing a sulphonamide group. Domagk[27] published his experimental results on the effect of this new compound "prontosil" on anti-streptococcal activity in animals in February of 1935. This immediately opened up great possibilities in clinical therapeutics, and since then a very large literature has been accumulating to prove the real worth of this form of treatment. The subject is entirely too complicated for me to attempt to discuss the technical chemical phases of the development of the several compounds now used. Suffice it to say that from the original prontosil a derivative, sulphanilamide—chemically known as P-amino benzene sulphonamide—was found to be a simpler more effective compound in its bacteriostatic effect on the hæmolytic streptococcus. This compound has been studied intensively now from all aspects, and is used as the standard to test the new derivatives that have recently appeared and are continuing to appear.

Whitby[28] in the Bradshaw Lecture for 1938, delivered before the Royal College of Physicians of London in November, 1938, discusses in a masterly way this chemotherapy of bacterial infections. From the standpoint of surgical infections two compounds at present stand out as most effective—sulphanilamide in its action on the hæmolytic streptococcus A, B, and C, the meningococcus, the gonococcus, and *B. coli* in infections of the genito-urinary tract and sulfapyridine, also known as dagenan, because it was first prepared by Ewins and Phillips in the research laboratories of May and Baker in Dagenham, England, the latest potent compound, which appears to be especially effective in combating pneumococcus infections, and is now considered even more potent against streptococcus and perhaps less toxic.

As regards the use of these drugs in the treatment of bacterial invasion, some very interesting observations were made by Lockwood,

Coburn and Stockinger[29] on a group of 200 carefully observed and analyzed patients treated with sulphanilamide at the Presbyterian-Columbia Medical Centre. I quote from their discussion of their study on the mechanism of the action of sulphanilamide.

> "The clinical aspects of this study showed striking differences in the effectiveness of sulphanilamide. These differences were related more to the character of the lesion than to the identity of the bacterial infection. The drug was most effective in bacteriæmia, lymphangitis, erysipelas and cellulitis; it was highly effective in early infections with little suppuration, that is, when the organism was in its active invasive phase. The drug was ineffective when abscesses were well established, except perhaps in limiting their further spread and protecting normal surrounding tissues against invasion when drainage was used.
>
> "The striking effect of sulphanilamide was a depression of the invasive properties of the organism. In contrast, the presence of débris, human or bacterial, diminished the effectiveness of the drug on hæmolytic streptococcus. In each instance the organisms remaining in broken-down tissue maintained their virulence. It is not known whether the débris itself had a protective action on the organisms or whether there was insufficient penetration of the drug into the locus. Sulphanilamide should be considered an agent which supplements, and in no way supplants, anti-bacterial immunity."

It is now fairly generally agreed that these azo-dyes which diffuse through the blood, the intercellular fluids, the cerebrospinal fluid, have more of a bacteriostatic action than a bactericidal one; that this check to their growth and activity enables the reticulo-endothelial apparatus and macrophagic wandering cells and the natural immune mechanism to dispose of the bacteria circulating in the blood and lymph vessels and present in the as yet undestroyed living tissues. That new chemical compounds will be found to combat in similar fashion the streptococcus viridans and the several types of staphylococci seems a logical prediction.

BACTERIOLOGY OF SURGICAL LESIONS

Certainly there is no question that Lister's greatest contribution to humanity and to science was his application of bacteriology to the study of surgical infections and his demonstration of the efficacy of the antiseptic principle. In all of his later professional life, when his active teaching of antisepsis and practice of surgery occupied so much of his time, and interfered with his productive scientific work, he followed with the keenest interest the rapidly developing bacteriological discoveries of such men as Koch, Pfeiffer and Behring.

There is no more important scientific activity in the surgical service of a hospital than that of an able bacteriologist trained in the principles and practice of surgery. Surely the Great Benefactor would agree to this statement, for he represents just such a combination, having contributed to both bacteriology and surgery, applying the former to the latter in preventing disease and death in the practice of the surgical art. It seems very strange that with such an example so few surgical clinics have developed as part of their organization a bacteriological laboratory and staff to study the many problems of infection and wound repair that are constantly present in the active work of every surgical service. The maintenance of sterility in the materials used in the operating room, the study of the bacteria found in the exudates and tissues of infections by surgeons bacteriologically trained to use prompt and adequate technique in taking cultures in the operating room and the wards, the critical review of the healing of wounds, clean and infected, with weekly reports and annual analyses, the immediate attack on any outbreak of a special type of infection in the surgical wards, the training of the younger interns and residents in bacteriological methods and critique, these are some of the many phases of a surgical clinic that require the services of a bacteriologically trained surgeon and an adequate laboratory in the surgical unit. With such a man and with such equipment the surgical team becomes more and more critical of sterile technique, clean wound healing, and more aware of the type of bacteria met with in inflamed and infected tissues and the reactions and lesions caused by the various organisms. This results in prompt and effective treatment.

Some twenty-three years ago, a group of us, then young surgeons, became interested in further training in bacteriology and had the privilege of studying for a time under the stimulus and guidance of that great teacher and scientist Hans Zinsser when he was Professor of Bacteriology at Columbia University. One of this group, Frank L. Meleney, became especially interested in the pyogenic organisms and anaerobic bacteria, and continued his studies when he went to the Peiping Union Medical College in Peiping, China.

In 1921, when I was called to the Chair of Surgery in Columbia University, I felt that a laboratory of bacteriology for the study of surgical problems was an essential part of our reorganization, and as soon as Dr. Meleney returned from China, in 1923, I was fortunate in

getting him to join our group. He had already made original discoveries in streptococcus gangrene, and continued his studies in aerobic and anaerobic surgical gangrene. His work is now internationally known in his studies on surgical gangrene, on wound infections, in establishing standards for sterilizing catgut, in the differentiating of acute and chronic micro-aerophilic streptococcus infections, singly and in symbiosis, and his great contribution to the therapy of many of these lesions by the use of zinc peroxide. As a result of his contributions from our clinic and the training of residents under him, the advantages of having trained bacteriologists on a surgical service is being more generally appreciated, and men trained by him are now working in other university surgical clinics.

be due to a hæmolytic streptococcus from the nose and throat of a carrier who was one of our operating-room nurses. Careful and adequate masking of the noses as well as the mouths of the operating-room teams immediately stopped the outbreak of clean wound infections. I asked Dr. Meleney to begin a careful analysis of our clean-wound healing, and for ten years he presented weekly reports with an annual report. The last three years this analysis has been made by our senior residents. With the increase of total numbers of clean wounds repaired, and with the introduction of the philosophy that develops with the use of fine silk as suture and ligature material, there has been a steady decrease in our percentage of infections in clean wounds. We do not expect to reach 100 per cent clean-wound healing, but

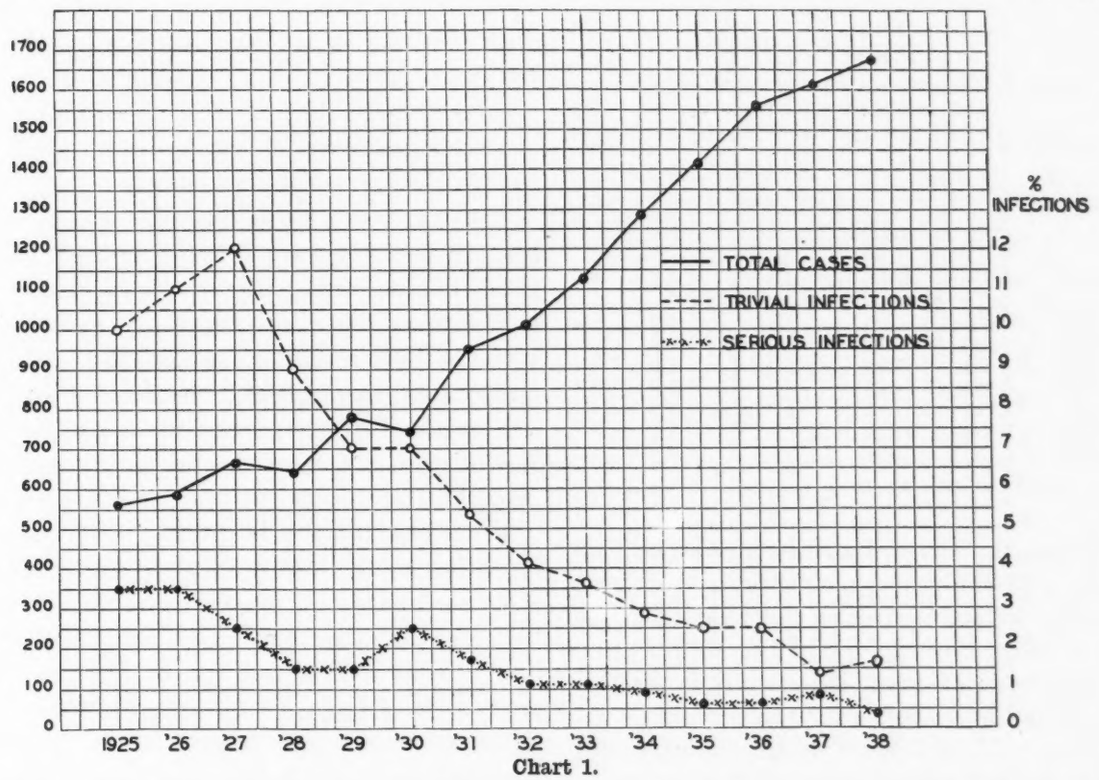

Chart 1.

As an example of one of the results of having such a group active in the surgical service let me point out the result of the surgical staff, attending and resident, becoming clean-wound-conscious. In 1926 we considered ourselves fairly superior in our technique and in our clean-wound repair. This was our impression, for we did not have carefully analyzed studies of all our clean wounds. An outbreak of hæmolytic streptococcus infections in our clean wounds was proved by agglutinin and cross agglutinin biological tests by Dr. Meleney to

we feel we can more nearly approach that limit, even if we may never reach it. (See Chart 1 and Tables I and II).

Two of the most heartening signs of improvement in the surgery of this continent in the past twenty years is the establishment in many hospitals of follow-up clinics and the long-term training of residents in the gentle handling of tissues and the meticulous asepsis of clean wound repair. Both these advances are in line with the principles and philosophy of Joseph Lister.

TABLE I.

WOUND HEALING—CLEAN CASES, 1925-1938

Year	Cases	Percentage		
		Total Inf.	Triv. Inf.	Ser. Inf.
Total	14,621	5.9	4.5	1.4
1925	558	14.0	10.0	4.0
1926	581	15.0	11.0	4.0
1927	653	15.0	12.0	3.0
1928	640	11.0	9.0	2.0
1929	771	9.0	7.0	2.0
1930	747	10.0	7.0	3.0
1931	950	7.1	5.4	1.7
1932	1,053	5.3	4.2	1.1
1933	1,132	4.8	3.6	1.1
1934	1,279	3.7	2.8	0.9
1935	1,417	3.1	2.5	0.6
1936	1,558	3.1	2.5	0.6
1937	1,614	2.2	1.4	0.8
1938	1,668	2.1	1.6	0.5

TABLE II.

WOUND HEALING BY SUTURE MATERIAL—CLEAN CASES, 1932-1938

Year	Cases		Percentage of Infect.	
	Silk	Gut	Silk	Gut
Total	6,615	2,435	2.3	5.7
1932	656	306	2.3	9.2
1933	526	351	3.0	8.0
1934	864	316	2.0	7.0
1935	994	423	2.7	4.0
1936	1,149	407	2.7	4.4
1937	1,296	318	1.9	4.1
1938	1,130	314	1.8	3.5

Because the Great Benefactor was so concerned with the scourge of surgical gangrene it is appropriate to discuss this subject in the light of more recent work in the classification and treatment of these lesions. It is strange to me that Lister, with his keen powers of observation, did not more clearly define and classify the different types of gangrene that so distressed him in the early years before he developed his life-saving antiseptic principle. I have failed to find any reference by him to appearance of gas bubbles or to the palpation of crepitus in the tissues of victims of hospital gangrene.

Godlee,[30] in his biography of Lister, under the caption Hospital Diseases, says

> "The following description of the varieties of hospital gangrene is almost in Lister's own words: One variety is where the disease advances with fearful rapidity; here the affected part becomes brown and black, but the blackness is not the same as that of ordinary gangrene, but brownish black. It may be that the inflammation in the vicinity is so great as to cause ordinary gangrene, when the blackness will be of a purplish colour. But hospital gangrene may be extremely languid and then the colour, instead of being brownish black, is pale and grey, such a colour as is produced by caustics on granulations, or as is seen on a 'weak' ulcer. There may be no pain and nothing characteristic of hospital gangrene, except that as you watch it you find the grey surface steadily increasing in size, and if it be scraped away it is found to consist of a layer of slough one-eighth of an inch or more in thickness. Between these two extremes—the weak form with pus formation but no pain or inflammatory blush, and the worst form with pain, redness and constitutional disturbance—there are all sorts of degrees. The constitutional disturbance consists of elevation of pulse, loss of appetite, and generally the symptoms of depression."

Tetanus and spreading gangrene are also spoken of as separate entities.

Meleney,[31] by his bacteriological studies, has established the specific etiology in hæmolytic streptococcus gangrene, post-operative progressive bacterial synergistic gangrene, and the chronic progressive undermining ulcer. As a result of determining the etiology of the various types of gangrene he has also established the specific therapy for these lesions.

Lister's earlier contention that the air of the operating room conveyed infecting organisms to clean wounds has been repeatedly confirmed. As a rule these organisms are of the less virulent varieties, but hæmolytic streptococci and staphylococci from the noses and throats of the operating team and spectators may prove very serious. For this reason careful masking of the noses and mouths of every one in the operating room is now an accepted requirement of every modern operating room. Air filtering of the operating room and irradiating the air above the operative field and the instrument tables with ultra violet light is being used more and more, although until methods for irradiating the air with ultra violet light are perfected, to protect the eyes and exposed surfaces of the operating team, this precaution is about as objectionable as Lister's carbolic spray.

It is now recognized that gentle handling of tissues, the use of delicate instruments and fine suture material, complete protection of the wound from the incised skin edges, together with complete asepsis of all solutions and supplies are the essentials in the philosophy of clean wound healing. It is this consummation of the surgical art that is the fulfillment of Lord Lister's life work.

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A CASE OF DISSEMINATED BLASTOMYCOSIS*

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BLASTOMYCOSIS affecting the skin is not an uncommon human infection, and as such was originally described by T. C. Gilchrist in 1894. Localized, solitary or, as Wade and Bel prefer to designate it, surgical blastomycosis, is occasionally seen, mainly and primarily affecting one organ. In its disseminated miliary form this affection now and then crops up dramatically enough to make us wonder whether, considering its protean manifestations, its recognition has not more often been missed. Since Walker and Montgomery published their report of the first American case of disseminated blastomycosis in 1902 cases have been recorded from all parts of the globe, including several from Canada.[1] It is noteworthy that in the more recent literature reports of new cases are fewer. The following case, a widely disseminated form, is hereby presented in some detail, because of its rarity and as a good illustration of the diagnostic perplexities involved.

The patient, an Italian fruit-peddlar, aged 48, was admitted on July 6, 1938, to the Mt. Sinai Hospital. His family history was irrelevant. He had lived in Toronto for some 35 years, except for a short visit to Italy in 1914. He had always been well, never drank or smoked, and denied venereal disease. He had always looked after his horse and did the chores about the stable. The present illness began insidiously. Early in the spring he complained of cough, marked weakness, and loss of weight. His best weight, about a year before, was 240 lbs. When first seen by one of us (M.K.) on May 11th, he weighed only 185 lbs. On that occasion he had fever, shortness of breath on the least exertion, a palpable spleen, an enlarged liver, and a mass in the right epididymis. There were also albumin and pus in the urine. After two weeks' rest in bed he felt so much better that he returned to his work, but not for long. An x-ray of the chest then suggested miliary tuberculosis. He was admitted to the hospital with the tentative diagnosis of broncho-pneumonia, probably tuberculous, pyelitis, and congestive heart failure.

His complaints on admission were still the same: marked weakness, shortness of breath on exertion, and loss of weight. By this time he had no longer any cough, there were no night sweats, and no urinary symptoms. He gave no history of any previous suppurative skin lesion. He was still partly ambulant, or at least felt well enough to be up and about.

Physical examination on admission was not markedly different from that six weeks before. The temperature, pulse, and respirations were moderately elevated. The pupils reacted to light and accommodation and were central, equal and regular. The eye-grounds showed marked arteriosclerosis but were otherwise negative. On the left ala nasi there was a small pustule, which then looked innocent enough. There was some muco-purulent nasal discharge, which was not excessive. There was obvious dental infection; the throat was clear; the thyroid gland was not palpable, nor were the cervical glands. The heart was enlarged to percussion, and a mitral systolic murmur was present. The blood pressure was 130/74. The peripheral blood vessels showed general arteriosclerosis. Examination of the lungs was rather ambiguous. There was bilateral limitation in expansion. On percussion there was no evidence of consolidation, and the râles at the bases, previously noted, had now disappeared. The abdomen was flat, and no evidence of free fluid could be elicited. The spleen was palpable about three fingers' breadths below the costal margin, while the left lobe of the liver formed a large rounded mass reaching well below the umbilicus, hard, and uniform in outline. The inguinal glands were not palpable. In the right scrotum there was a hard tender mass, the size of a hazelnut, which the patient thought had been present for a long time. The prostate was enlarged, soft, but not tender. The neurological examination was entirely negative.

Laboratory examination.—Urinalysis.—Albumin and pus were present but not constantly. Cultures of the urine showed *B. pyocyaneus* and *B. coli*, while both cultures and guinea-pig inoculations were negative for

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tuberculosis. Blood.—The white blood cells were 8,350; neutrophils 72 per cent, lymphocytes 23 per cent, eosinophils 3 per cent, monocytes 2 per cent; red blood cells 4.1 millions; hgb. 80 per cent. The sedimentation rate was 25 mm. in 1 hour. The blood and spinal fluid Wassermann tests (Kolmer) were negative. The non-protein nitrogen was 42 mg.; van den Bergh 0.5; and blood sugar (fasting) 160 mg. per 100 c.c., with a diabetic glucose tolerance curve. Agglutination tests were negative for gonococcus and *B. mallei*. Three blood cultures were negative. The examination of the spinal fluid was essentially negative. Gastric analysis showed free HCl, q.s., and no blood. The electrocardiogram showed negative T's in all leads, including IV F, but the S-T segment was iso-potential.

Radiology.—An x-ray examination was done of the chest, gastro-intestinal tract, gall bladder, kidneys and lower extremities. The skull was not x-rayed. The report on the chest follows. (Fig. 1.)

"There is an extensive miliary distribution of lesions roughly about the size of a pin-head throughout both lungs. On the left side these have a tendency to be larger, being almost the size of a pea. Below the 4th rib there is a definite tendency towards conglomeration. As far as can be seen there is no definite evidence of old infection of either lung. Generally speaking, the lesions appear somewhat larger and denser than those usually found in miliary tuberculosis. In some areas the lesions appear to have translucent centres. This is found especially on the right side. The appearance is that of a lesion of miliary distribution simulating miliary tuberculosis but differing from it in that the lesions are, generally speaking, denser, larger, and show a tendency to conglomeration and central necrosis. In view of the finding of blastomycosis on the skin lesion, the lesion in the chest is probably of the same nature."

A barium meal revealed nothing of significance except the displacement of the stomach upwards by the enlarged spleen. The gall bladder showed poor function on administration of iodekeion. In the plates of the kidneys following diodrast injection nothing of significance was shown. Both kidneys were visualized and appeared normal in size, shape and position. "Roentgen examination of the lumbo-dorsal spine reveals evidence of a well-marked spondylitis of the hypertrophic type, with almost complete bridging in the upper lumbar region. There is however, no definite evidence of bone destruction or of any lesion such as might be caused by mycotic or tuberculous infection."

The left leg revealed an area of bone destruction on the anterior surface of the tibia at the junction of the middle and lower thirds. There was no evidence of any bone or periosteal reaction, the lesion appearing purely destructive.

Progress.—For the first two weeks in the hospital the patient's condition seemed stationary. In fact there was little change in physical signs since he was first seen two months earlier. His temperature, pulse, and respirations fluctuated above but close to the normal lines. The spleen and liver remained about the same and the physical signs in the chest showed no change until near the end. The innocent-looking pimple under his nose grew apace, and when incised yielded only a few drops of oily-looking fluid. (Fig. 3.) It now became bulbous and more fluctuating. Glanders suggested itself and a biopsy was decided upon.

Meanwhile, another phenomenon occurred. The neurological examination had been persistently negative up to July 21st. On that day he showed weakness in the right leg with loss of sensation to heat and cold and pain in the region of the inner border of the tibia. Touch was less affected, and postural sense not at all. The reflexes were lost, except the ankle jerk, which became exaggerated and showed an unsustained clonus. This rapidly extended upwards and by the next day had spread to the left side. Within two days a transverse myelitis was fully developed, affecting motor, sensory and sphincteric functions, and involving at least some of the intercostal muscles on the right side, but extending to a much lower level on the left side.

The biopsy was performed on July 23rd under local anæsthesia and both the nasal mass and the right testicle were removed. Blastomycetes were found in both tissues, and positive cultures were also obtained from the pus within the epididymis and from a superficial pustule that appeared on the right leg just above the ankle. On subcultures these were definitely identified as *Zymonema dermatitidis* or *Blastomyces gilchristi*. On inoculation into mice these organisms were recovered in three days from the peritoneal washings, but later washings failed to show the organisms. No typical lesions were found on autopsy.

The patient's general condition steadily grew worse. He now ran a high temperature, the spleen rapidly enlarged, and there were fine moist râles over both bases. On August 3rd he died with hyperpyrexia.

Clinical diagnosis. — Blastomycosis affecting the lungs, liver and spleen, the right epididymis, the spinal cord, and terminal invasion of the skin and osseous system; spondylitis; hypertrophied prostate; arteriosclerosis; myocardial disease with congestive heart failure; terminal broncho-pneumonia.

The biopsy.—The material removed from under the nose was a dark red nodule, approximately 1.5 cm. in diameter, friable, and quite rough. Its cut surface was finely granular, soft and light red in colour. At one pole of the epididymis removed with the testicle there was a firm nodule, approximately 2 cm. in diameter. A small portion of the adjacent testicle was also included in the nodule. The cut surface showed many soft areas which contained creamy material. No other gross abnormalities of the testicle and epididymis were observed.

Microscopic examination of both specimens suggested that the pathological processes in each were the same, except for minor features attributable to the different locations. Areas of frank necrosis were common. In and about these were many polymorphonuclear leukocytes. Surrounding these areas was a definite fibroblastic stroma in which were many multinucleated giant cells of the Langhans type, round and plasma cells, and occasional capillary loops. In the necrotic area, in some of the giant cells, and sometimes in the fibroblastic stroma were spherical bodies with a refractile doubly-contoured shell. Some of these were in a budding stage. In the nasal biopsy, in addition to the features already mentioned, there was a marked overgrowth of the stratified squamous layer of the skin, and a marked keratinization as well.

The autopsy.—This was performed two hours after death. The skull was not opened. Among the salient features was the fact that there was no emaciation, since in most cases of disseminated blastomycosis marked emaciation is the rule. In the skin over the left malleolus there was a discrete, raised, reddish-brown mass, 1 cm. in diameter.

The lungs each weighed 716 grams. Their external surfaces were smooth, dark greyish-pink in colour, mottled by black. Each was moderately firm in consistency and non-crepitant for the most part. (Fig. 2.) Myriads of small, firm nodules could be felt in each lung, which on cut section appeared as light greyish-brown, firm masses, the largest measuring 0.5 cm. in diameter. Grossly the appearance of the lung was not unlike that of miliary tuberculosis, except that the nodules were slightly larger.

The spleen weighed 732 g. The external surface was greyish-brown and smooth except for a few small light greyish-brown areas. The organ was moderately soft in consistency. The cut surface was rough and reddish-brown. The lymph nodes presented no gross abnormalities. The liver weighed 2,629 g. It was of the usual shape but greatly increased in size. The external surface was light brown and studded with various fine nodules, the largest being 0.75 cm. in diameter. It was firm in consistency. Its cut surface was coarsely granular and light brown. The prostate, while of average size and consistency, on section showed many areas of softening in which there was a viscid, creamy material.

A portion of the spinal cord from the seventh thoracic vertebra to the cauda equina was removed by

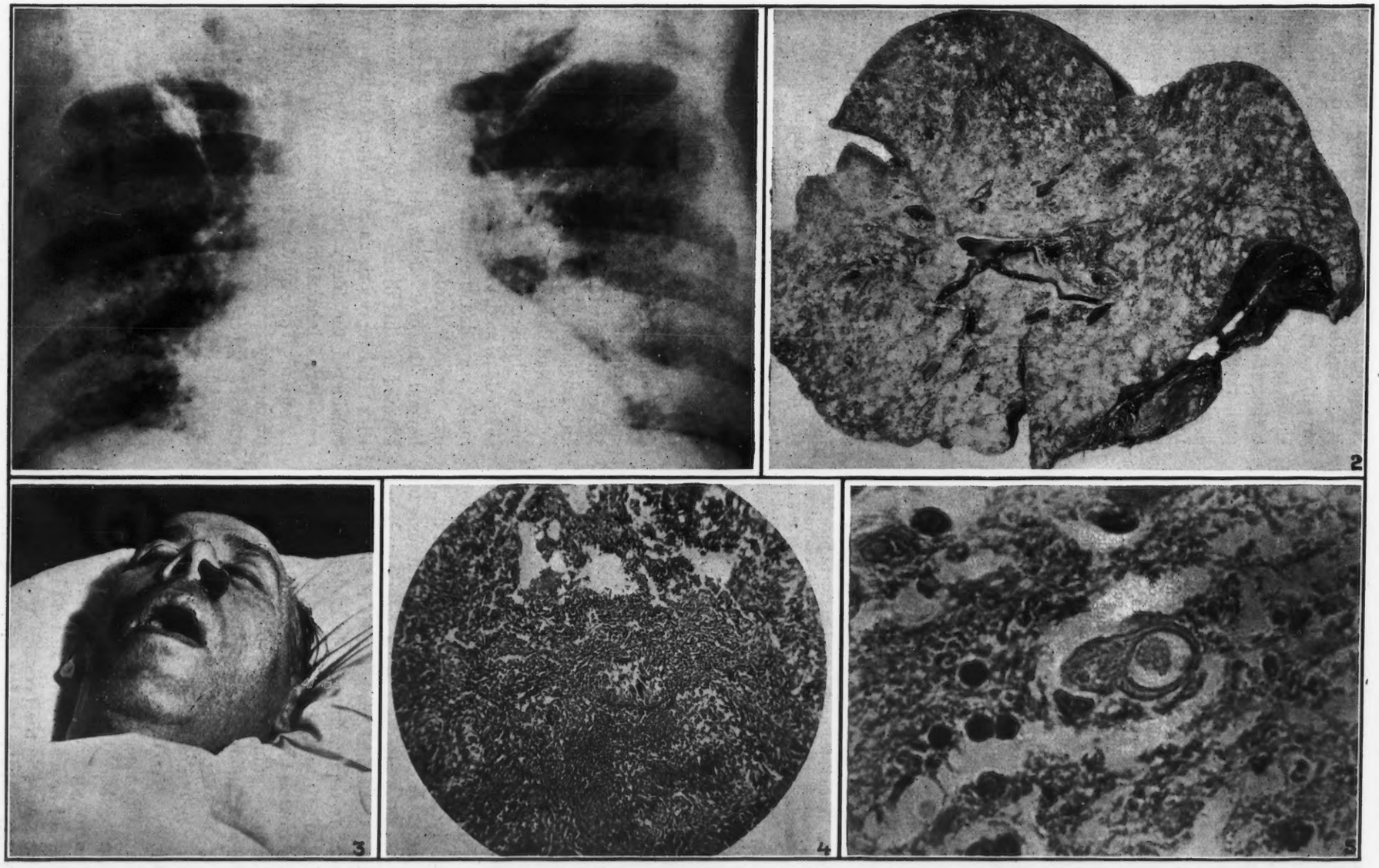

Fig. 1.—X-ray of chest. Distribution of lesions suggest miliary tuberculosis, but differ in the hilar distribution, and in being coarser, larger and more dense. **Fig. 2.**—Blastomycosis of lung. Gross appearance showing miliary distribution of lesions. **Fig. 3.**—Mass under ala nasi. **Fig. 4.**—Blastomycosis of lung (x 50) showing a large area of caseous necrosis and tubercle formation. **Fig. 5.**—Blastomycosis of spinal cord, showing an organism in the budding phase.

the abdominal route. The cord was moderately soft, especially in its distal portion. Repeated sections showed many small areas of softening and in some places poor demarcation between the grey and white matter.

Microscopically, the lesions in the prostate were comparable with those seen in the nodule of the right testicle and epididymis. Except for a few regions, the necrosis was so great that the typical architecture of the prostate was lost. In the lung the lesions were quite heterogeneous. While large areas of necrosis surrounded by atypical granulomatous reaction were not uncommon, many of the lesions were very much like miliary tubercles. (Fig. 4.) They consisted of coalesced histiocytes, some containing the blastomyces, with an occasional Langhans giant cell. Many such areas were surrounded by a narrow zone of young fibroblasts. In the larger lesions the polymorphonuclear leukocytic infiltration was often dense. Many of the alveoli and bronchioles also were filled with these cells. In some regions there was evidence of healing with much fibrosis and actual hyalinization of the tubercles. The spleen and liver showed chronic splenitis and hepatitis of a non-specific type. No necrotic areas were present, nor any foci of the usual granulomatous formation. No organisms were found in either organ.

The spinal cord was of particular interest, as our case is the third on record showing involvement of that organ, so far as we can determine. Large areas of softening were common and occurred particularly in the lateral parts of the dorsal columns of white matter. These areas contained large numbers of lipoid filled histiocytes. Vacuolated areas of œdema were present in the white matter of the periphery of the ventral and lateral columns. No inflammatory reaction was evident anywhere. Demyelination of the softened tissues and the vacuolated areas of œdema was demonstrated. In only two sections out of many were the blastomyces seen, and here at the margin of an area of softening. (Fig. 5.)

Incidental findings were: marked arteriosclerosis of the left coronary artery with an old thrombosis in the descending branch, and healing infarction of the left ventricular wall. There was also slight nephrosclerosis. Neither of these organs showed the mycotic lesion.

(The mycological studies of this case were done at the Ontario Provincial Health Laboratories, for whose kind and valuable cooperation we hereby express our sincere thanks.)

DISCUSSION

The specific pathogen of blastomycosis or Gilchrist's disease on this continent, and therefore dubbed by Moore[2] the North American type, is the *Zymonema dermatitidis,* along with some ten closely related species. It is one that is not difficult to recognize, provided it is looked for. It is readily demonstrated in body fluids by the addition of 10 to 20 per cent sodium or potassium hydroxide to the material examined, which is allowed to stand for a while and then examined with subdued light. In stained specimens it is often missed because of its close similarity to lymphocytes. In sections it is seen as a doubly refractile, often budding body, 8 to 20 microns in size, and often contained within the giant cells. It grows luxuriantly at room temperature on artificial media, even on moist wood, bread or leather, not so readily at higher temperatures or in the presence of bacteria, and is therefore often missed in incubated cultures. An important characteristic is that in the tissues it multiplies only by budding and forms no mycelia or ascospores; in artificial media it shows mycelia after a while. Its natural habitat is that of dark, moist, filthy unventilated ground, and therefore stables, cellars and other unhygienic places provide the proper environment for infection.

The pathogenic fungi, following Jacobson, may be grouped into four categories: (1) those that affect the skin exclusively; (2) those that mainly invade the skin, often form localized internal lesions, and only rarely become disseminated; (3) those that attack internal organs as readily as the skin and may freely disseminate; and (4) those that affect internal organs only, with predilection for special tissues. Blastomycosis falls into the third category, being able to invade with equal facility any or all tissues, and spreading by continuity, by way of the lymphatics, or by the blood stream. Lowered individual resistance and increased virulence of the infective organism may be determining factors. The portal of entry may also determine its further spread. The cutaneous form rarely becomes disseminated; this was the origin in only three of the 29 cases collected by Stober. In this form trauma is an important etiological factor and further trauma, including surgical cauterization, may precipitate dissemination. Infection may follow trauma in the absence of any obvious skin lesion, or, if there was any, which had healed. Thistles, slivers and other foreign bodies, when retained, have been considered as media for infection. In one case a bullet provided the nidus for localization. Unlike actinomycosis the gastro-intestinal tract beyond the oral cavity seems to be but little affected in this disease. In one case,[3] however, with a blastomycotic gastric ulcer, this tract was considered the likely portal of entry. Stober considered inhalation as the major atrium of infection. The evolution of the disease following pulmonary invasion is probably closely akin to that of tuberculosis. A primary complex is established in the lungs or bronchial glands, which may be followed by hæmatogenous dissemination, ultimate re-localization and spread by continuity or the lymphatics.

The close mimicry of tuberculosis by this disease is not only shown in the history, physical signs, and clinical course, but extends even to the microscopic appearance. Medlar and Miller[4] have made studies on lung lesions and

believe that, except for the presence of blastomycetes, the lesions are essentially the same. Gaspar,[5] on the other hand, emphasizes that in the fungus infection the lesions are essentially abscesses — miliary or gross — surrounded by polymorphonuclear leukocytes. "The rampart of round cell infiltration seen around the focus of a tubercle is entirely missing in the large majority of blastomycotic foci." In our case the polymorphonuclear leukocytic infiltration was quite marked. The demonstration of the organism is, of course, proof positive of the disease. The number of organisms present in a given lesion apparently has no bearing on the intensity of the inflammatory reaction. In many instances where the reaction was most intense the organisms were few in number or absent entirely. Often, too, where the inflammation was slight, they were profuse. As may be noted in our case, there was no definite inflammatory reaction in the spinal cord, suggesting that the lesion produced may have been due to the liberation of some toxin from the organism. In removing the spinal cord special attention was paid to the vertebræ. No evidence of caries or dislocation was noted. This is important, because in many cases presenting neurological signs attributable to spinal cord damage there has been a blastomycotic caries of the vertebræ with resultant collapse and pressure on the cord. This series of events produces a syndrome akin to that of Pott's disease of the spine. In conclusion, the inflammatory reaction to the blastomyces might readily be called "a suppurative granuloma".

Diagnosis.—Few diseases show such little individuality as systemic blastomycosis, which is the reason why a disease which should be readily diagnosable has so often reached the autopsy room undiagnosed. The greatest confusion has been with tuberculosis, pulmonary, cutaneous and osseous, the more so since the two diseases may co-exist. By and large, however, a multiplicity of lesions, especially when involving lungs, skin and bone, suggests a fungus infection. The clinical picture is that of a subacute or chronic pyæmia. In the lungs the extent of the lesions always exceeds the degree demonstrable by physical signs. In the x-ray plates of the chest, too, there may be evidence of greater involvement than the symptoms warrant. Although not characteristic, the chest plates may be suggestive of a mycotic rather than a tuberculous lesion, in the hilar distribution of the lesions, in the fact that the lesions are coarser and do not reach the periphery, and in that they may show more calcification of hilar distribution than in tuberculosis. In the brain a blastomycoma may go symptomless until pressure signs become apparent. Since other pathogenic fungi when they become disseminated present a very similar clinico-pathological picture, the final diagnosis depends on the identification of the invading organism. This may be recovered from any pustule or abscess, the sputum, urine, spinal fluid and occasionally the blood. A negative finding does not necessarily exclude the diagnosis, since the organisms may at times be difficult to find. Inoculation into mice may allow recovery of the fungi from the peritoneal washings, as was done in our case. Laboratory animals, however, are generally resistant to systemic invasion. Injection of infected material into male guinea pigs is said to cause a degeneration and atrophy of the testes. A complement fixation test has been recommended by Martin, while agglutination and intracutaneous tests have also been advised. Finally, a biopsy, as in our case, may readily establish diagnosis.

Treatment.—In a disease with as grave a prognosis as disseminated blastomycosis obviously the various therapeutic measures suggested have not proved their value. Possibly a much earlier diagnosis may engender more effective therapy, a desire much to be hoped for. In the cutaneous forms iodides have proved of great value; in the disseminating form, however, their action is not at all impressive. In the localized form, wherever feasible, surgical eradication has at times been successful. In Primrose's two cases and in Gillies' case operation was followed by recovery. An interesting therapeutic result is that of a woman who after two years of pulmonary blastomycosis developed the disease in the pelvis. Following hysterectomy and tubo-ovarian ablation she made an uneventful recovery.[6] In disseminated blastomycosis iodides still hold the fort, given both orally and intravenously to the limit of tolerance. Crystal violet and other dyes, arsphenamine, tartar emetic, and various vaccines have had their advocates. Our patient received large doses of sulphanilamide without any obvious value. More recently thymol, 50

per cent in olive oil, has been recomemnded in the treatment of coccidioidal granuloma, in doses up to 6 grams daily, and may prove useful in other mycotic infections. Perhaps, even as in tuberculosis, our cherished hope of improving the future outlook in this disease may be contingent solely on an early diagnosis and general hygienic measures. Spontaneous recoveries have been noted.

SUMMARY

A case is presented of blastomycosis widely disseminated through various organs. The pathological findings show lesions typical of the disease, and the infective organism has been definitely identified. While no new features are demonstrated, emphasis is laid on the necessity for early diagnosis and the main reason for the lack of it—one does not think of it.

We wish to take this opportunity to express our sincere appreciation to Professors Boyd, Robinson, and Linell, of the Department of Pathology of the University of Toronto, for their keen interest and helpful suggestions offered us in the study of the pathology of this case.

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A MOULD FROM THE EAR

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A NUMBER of species of fungi have been found growing within the human ear. The aspergilli are the chief of these, with a record of ten species, but Dodge[1] considers that the descriptions of many of them are so vague that it is doubtful whether they could again be identified. A single species of penicillium, *P. minimum* Siebenmann, has been recorded. Among the mucors there are two species. These are: *Mucor corymbifer* Cohn., isolated from the ear in 1884 by Huckel, in 1889 by Siebenmann, and in 1890 by Graham; and *M. ramosus* Lindt, isolated from the ear in 1881 by Jakowski. This article will give a description of a third species of mucor producing otomycosis, *i.e., M. circinelloides* van Tiegh.*

The patient, a nurse, presented herself to one of the authors, complaining of deafness and of itching in her external auditory canals. Examination revealed that the canals of both ears were plugged with a dense mat of mycelium, forming a false membrane in front of the eardrums. The mats were removed and cultures were made from them. The fungus obtained in culture was a mucor which was kindly identified by Dr. G. R. Bisby of the Imperial Mycological Institute as *Mucor circinelloides*. It has been isolated from the soil in England, Japan,

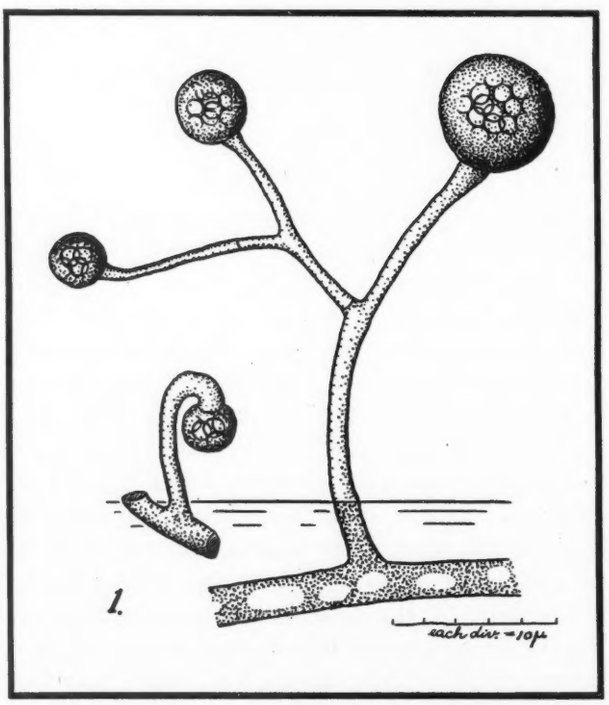


Fig. 1.—*Mucor circinelloides.* The sporangiophores have grown out from the agar into the air and have produced sporangia. Their branching is cymose and the shorter sporangiophore is typically curved.

* A culture of *Mucor circinelloides* has been deposited at the National Collection of Type Cultures, Lister Institute, London, England.

Switzerland, and the United States; but it is not a very common mould.

The description of the fungus as given by Gilman and Abbott[3] is briefly as follows:

"Sporangiophores circinate, forming a short turf about 1 cm. long, close and deep brown, with cymose branching. Sporangia globose, deep brown, 50 to 80 μ in diameter. Columella hemispheric, spheric, or oval. Spores globose or elliptic, pale gray in mass, 3 μ x 4 to 5 μ."

In addition, we have noticed that some of the columellæ bear a few minute conical projections, and that spores of our strain have a greater range in size, measuring 2.5 to 4.25 μ x 2.5 to 6.5 μ.

The species is distinguished chiefly by the cymose branching and the curved sporangiophores (Figs. 1 and 2). It differs from the other two mucors isolated from human ears in the characters tabulated in the accompanying Table.*

showed a dense growth of mycelium crowned with sporangia.

In 1884, Lichtheim[4] injected spore suspensions of *M. corymbifer* and *M. rhizopodiformis* into the veins of rabbits and found that the animals died within about 72 hours. Since then, *M. corymbifer* has been isolated not only from comparatively mild infections of the ear but also from patients suffering from severe general mycosis (Paltauf, 1885), pulmonary mycosis (Podak, 1889, Ernst,[2] 1918), and mycosis of the nose and throat. Furthermore, *M. rhizopodiformis* (*R. cohnii*) has been found (T. Smith,[6] 1920) to be a cause of abortion in cattle.

M. circinelloides resembles *M. corymbifer* not only in its behaviour toward ear-wax but also in being thermophilic: its spores sown in tubes of Sabouraud's medium and incubated at 57° C. showed within three days a dense growth of sporangia-bearing mycelium. In view of the

THREE MUCORS COMPARED

	M. Corymbifer	*M. ramosum*	*M. circinelloides*
1. Habit	Branching in corymbs (Figs. 5 and 8); primary axis erect; few if any rhizoids	Branching in corymbs, but more lax than *M. corymbifer;* resupinate stolons with rhizoids	Cymose branching; curved sporangiophores
2. Mycelium	Coarse, may be 10 μ in diameter		Fine, averaging less than 6 μ in diameter
3. Apophysis	Uncoloured	Violet	Uncoloured
4. Columella	Hemispheric or conical, sometimes with spinescence	Mostly ovoid; not spinescent	Hemispheric, spheric or oval (Fig. 7); sometimes spinescent
5. Spores	Nearly spherical, 2 to 4 μ sometimes 6 μ	Elongate, oval or sub-cylindric, 4.5 x 2.8 μ	Oval, 2.5 to 4.25 x 2.5 to 6.5 μ (Fig. 6)

M. circinelloides grew readily at room temperature in Sabouraud's medium, malt agar, and prune agar.

Experiments were made to determine whether or not certain moulds grow on human ear-wax. The spores of *Rhizopus nigricans, Mucor hiemalis, M. corymbifer,* and *M. circinelloides* were sown on sterilized ear-wax contained in test-tubes, two tubes being used for each of the four species. At the end of a month, in the tubes inoculated with the saprophytes *Rhizopus nigricans* and *M. hiemalis* no growth was obtained, although transfers of the inocula to a more suitable medium revealed that the spores were viable. On the other hand, within 11 days, the tubes of wax inoculated with *M. corymbifer,* which is a parasite, and with *M. circinelloides* fact that *M. circinelloides* resembles *M. corymbifer* in growing on ear-wax and in being thermophilic, it was thought desirable to find out whether or not it also resembles *M. corymbifer* in being parasitic. The experiments now to be described were therefore undertaken.

Three rabbits, A, B, and C, were used. Rabbit A was inoculated with *M. corymbifer* obtained from the Centraal Bureau voor Schimmelcultures, Baarn; and rabbits B and C were inoculated with *M. circinelloides.* Before the rabbits were inoculated, sterile saline solution was poured over slants supporting a growth of mucor and shaken up. A sample of the solution was examined microscopically to make sure it contained a rich suspension of spores. About 1 c.c. of solution was injected into the vein of an ear. All the rabbits remained active during the first 24 hours. During the second and third

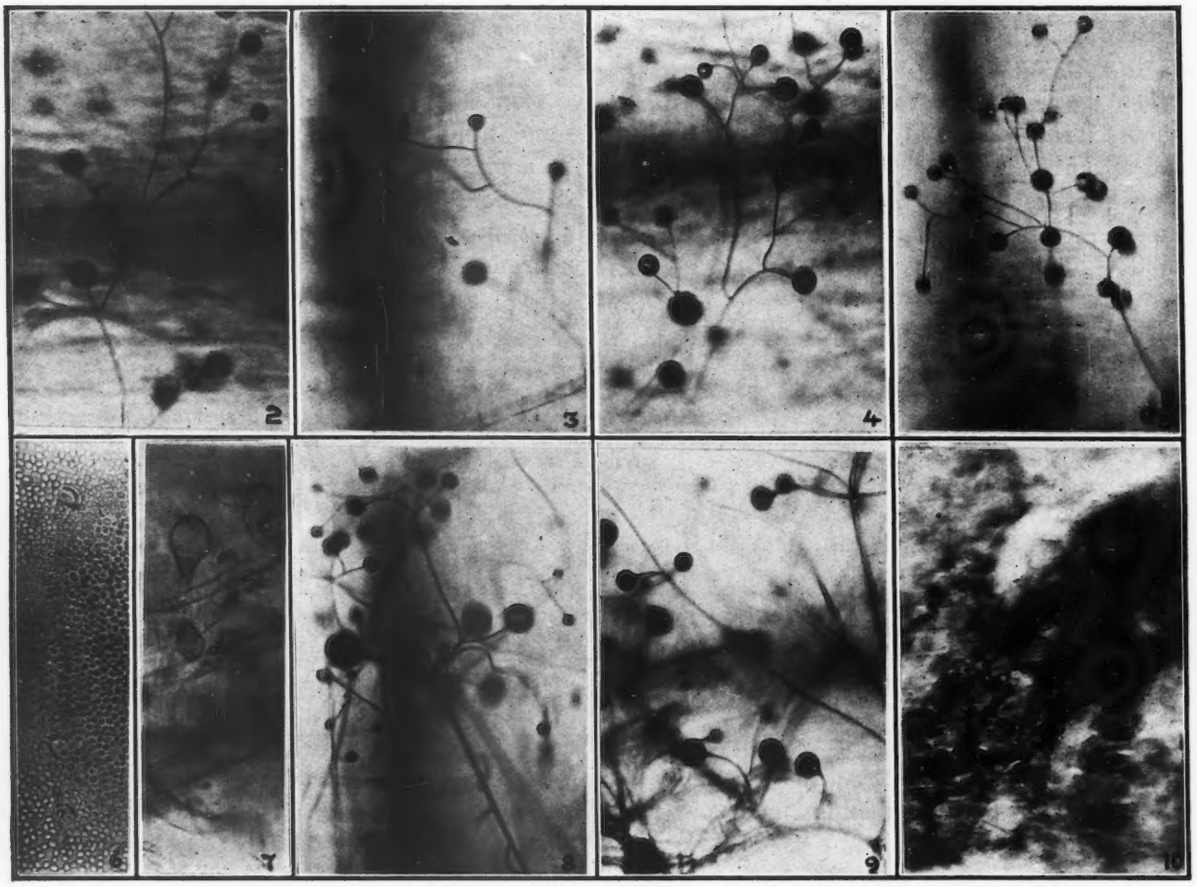
* Description of *M. ramosum* as given by Vuillemin.[7]

day, A became dormant; and it died on the fourth day. During the fourth day, B and C became dormant; and they both died on the fifth day.

The three animals were submitted for pathological examination to Dr. J. W. Macgregor (Department of Pathology, University of Alberta) who found that the condition of rabbit A injected with *M. corymbifer* was similar to that of rabbits B and C injected with *M. circinelloides*:

> "On opening the thorax of each animal, it was found that the heart and spleen were normal in appearance, while the lungs and kidneys were congested. The most abnormal organs were the kidneys. When cut through, they were found to be inflamed from the cortex to the medulla. The glomeruli were congested, the convoluted tubules showed a cloudy swelling, and the collecting portions showed advanced necrosis. There was much recent hæmorrhage into the interstitial tissue of the medulla. Many of the tubules were filled with pus and the interstitial tissue surrounding them was infiltrated by many polymorphonuclears. The liver was enlarged and contained yellow nodules, but this was found to be due, partially at least, to coccidiosis."

Paraffin sections were made of the heart, lung, liver, and kidney, and they were stained with safranin and eosin, or with cotton-blue. The cotton-blue was absorbed by the hyphæ and these showed up well against a light background (Fig. 10). No fungal mycelium was found in the heart or lung; but, after a long search, a few hyphæ were discovered in the liver. However, the appearance of the kidney was very different, for this organ was found to contain hyphæ in great abundance. These hyphæ were branched and non-septate, and they had penetrated into the glomerular capsules, the lumina of the tubules, the interstitial tissue, and the thrombosed vessels.



Figs. 2 to 4.—Test-tube cultures of *M. circinelloides* growing on Sabouraud's medium, photographed through the glass to show the cymose branching. **Figs. 5 and 8.**—Similar cultures of *M. corymbifer* showing corymbose branching. **Fig. 6.**—Spores of *M. circinelloides*. **Fig. 7.**—Columellæ of *M. circinelloides*. **Figs. 9 and 10.**—*Mucor circinelloides* from rabbit. **Fig. 9.**—Culture (showing circinate habit) obtained from liver. **Fig. 10.**—Hyphæ within kidney (section stained with cotton-blue). Magnification: Figs. 2 to 5 and 8 and 9, 150; Figs. 6, 7 and 10, 300.

In comparing the effect on animals injected with *M. circinelloides* with that on animals injected with *M. rhizopodiformis* by Lichtheim and with *M. corymbifer* by Lichtheim and by the authors, we find that the animals injected with *M. circinelloides* showed the longest latent

period before sickening and lived longer than the others. On the other hand, in its effect on the organs of the animals, this species behaved exactly like the other two; for Lichtheim found that in his experimental animals injected with *M. rhizopodiformis* and *M. corymbifer*, the heart, spleen, and lungs remained free from the parasite, while the liver was slightly infected, and the kidney very severely infected.

Cultures of *M. circinelloides* were recovered from the experimental animals as follows. With aseptic technique, four portions of the affected kidney were planted upon four slants of Sabouraud's medium and four other portions in moisture condensed on the under side of a coverglass placed over a ring-cell damp-chamber. Within 24 hours, a coarse mycelium grew out from each of the eight portions of kidney, and soon it produced sporangia. A microscopic examination showed that the organism was *M. circinelloides*. The fungus was recovered not only from the kidney but also from the liver (Fig. 9).

The experiments which have just been described suggest the pathogenicity of *Mucor circinelloides*. Although, up to the present, this species has been isolated only from the soil and from a relatively mild infection of the external ear, it is possible that, in the future, it may be isolated from internal organs of patients who have suffered from severe mycosis.

SUMMARY

1. *M. circinelloides*, previously known as a comparatively rare soil fungus, has been isolated from the human ear.

2. The fungus is described and compared with the two other species of mucor known to infect the ear.

3. *M. circinelloides* is able to grow on sterilized ear-wax, and it is thermophilic.

4. Rabbits which had been injected intravenously with spore suspension died within five days.

5. The mycelium proliferates chiefly in the kidney of the animal.

6. Cultures of *M. circinelloides* have been recovered from the kidney and liver of animals inoculated intravenously.

7. After Lichtheim had demonstrated experimentally the pathogenic nature of *Mucor corymbifer*, other workers recovered the fungus from natural infections on human beings. It is possible, therefore, that *M. circinelloides* at some future time will be isolated from patients who have suffered from severe mycosis.

The authors wish to express their best thanks to Professor A. H. R. Buller, who, during his visit to Edmonton, assisted us in the preparation of the manuscript.

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TREATMENT WITH NICOTINIC ACID RELIEVES RADIATION SICKNESS.—"In spite of increasing knowledge and improved technique in the use of roentgen rays, radiation sickness continues to be a major problem for those who are using high voltage treatment. With the addition of nausea and vomiting to the discomfort of those already suffering from cancer, it is not surprising that some patients prefer to discontinue their treatment rather than suffer this additional distress." The author points out that the cause of radiation sickness has not been determined but the absorption of poisonous substances from the breakdown of the tissue cells would seem to be a justifiable theory. The mental factor also must be always kept in mind, although it would seem to play only a subsidiary part. In the series of cases reported, distressing symptoms of nausea and vomiting developed in 27.6 per cent of patients receiving high voltage radiation over a period of approximately six months. Of the 70 cases treated with nicotinic acid 27.1 per cent showed excellent results and 47.2 per cent good results. In other words "the drug was definitely effective in 74.3 per cent of this group of cases. A fair result was obtained in 14.3 per cent, and in 11.4 per cent nicotinic acid failed." Dr. Graham says that the results from nicotinic acid treatment would appear to be better than from pentobarbital sodium or intramuscular liver and that the ease of administration with no unpleasant after-effects is definitely advantageous.—Graham, J. W.: Radiation sickness, *J. Am. M. Ass.*, 1939, **113**: 664.

COMMON RECTAL CONDITIONS

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EVERY practitioner encounters the common rectal conditions, piles, fissure, fistula and pruritus, and they are frequently dealt with by "trial and error" methods. We desire to emphasize fundamental principles which make for such precision in diagnosis and treatment that improved results must inevitably follow, bringing with them devoted patients.

PILES

Piles are considered as internal and external. External piles are not true piles or hæmorrhoids. Any of three different pathological conditions may bring the patient to his doctor.

A dilated perianal vein.—This can be seen or felt as a soft bluish, compressible swelling, often associated with irritation. In itself it rarely causes symptoms, and requires only reassurance and cleanliness of the parts with regulation of the bowels.

A perianal hæmatoma.—This is not a thrombosis of the perianal vein, but is a true hæmatoma due to rupture of the vein, as from straining. This can be demonstrated if the clot is dissected out of the surrounding tissues. It is first soft, blue, and painful; later, firm and less painful, and is often the precursor of the external tag which forms by the resulting inflammation, œdema, and fibrosis of the overlying skin. The clot may be absorbed, suppurate or ulcerate.

If seen early, or, if large, the hæmatoma should be incised, or rather unroofed, with fine scissors under local anæsthesia. The clot should be extruded and a moist wool swab of 1:500 bichloride of mercury applied.

If seen late, or if small, a soothing lotion will alleviate the symptoms. Such a lotion is one composed of liq. plumbi subacetat., spiritus vini rect., glycerinum and aq. rosæ.

Hypertrophied skin tags.—These result from perianal hæmatoma, scratching, or constipation with tearing of the anal skin followed by infection, œdema and fibrosis. These tags make cleanliness difficult, and promote irritation, scratching, and further irritation, to establish a vicious circle. These may be removed with local anæsthesia, leaving a cuff ⅛ inch from the adjacent skin level so that the margins are easily apposed. No sutures are required.

Internal piles or hæmorrhoids are dilatations of the veins which accompany the branches of the superior hæmorrhoidal artery, together with overlying mucous membrane and connective tissue of the submucosa. Thus the situation and number of piles are determined on anatomical grounds and follow established rules.

The superior hæmorrhoidal artery, a branch of the inferior mesenteric, divides into a right and left branch which take their respective positions on the sides of the rectum. The right branch divides into two main branches, a right anterior and a right posterior, while the left artery remains undivided. There are thus three primary piles so named RA, RP, and L, which appear in the anal canal in these designated areas, or at 2, 5 and 9 o'clock if named with reference to the face of a clock which has 12 placed at the coccyx. See Fig. 1.

These main branches subdivide in typical fashion, and thus may give rise to smaller collateral piles which appear subsequently to the primary piles and may be termed secondary piles. The right anterior (RA) remains unbranched. The right posterior (RP) gives two collaterals, a right (R) and a posterior (P). The left (L) gives two collaterals termed left anterior (LA) and left posterior (LP). Rarely, a small anterior pile (A) is formed which may arise from (LA). This is illustrated in Fig. 2.

If a patient of twenty to forty years has the primary piles removed he may still develop secondary piles, so one should be hesitant to say he will never again have piles. If an older patient has all the existing piles removed a cure is more to be expected, as he has probably developed all the piles that ever would develop. The terms "primary" and "secondary" piles are confusing, in that "secondary" is also used to designate a pile due to a primary etiological factor such as liver cirrhosis, neoplasm of the bowel higher up, etc.

The best examination for piles is made with the patient in the right lateral position with the

knees drawn up, inserting the gloved left index finger into the anal canal. The right hand is free for injections or treatment; and the sigmoid which lies to the left side is uppermost, so the blood flow tends to gravitate into and distend the piles. Primary piles can be felt in this position if the inserted finger is gently rolled in the axis of the anal canal over the distended vertical fold of the pile.

There is an arbitrary division of piles into three stages. In the first stage they are not palpable and present a thin mucosa with bleeding. In the second stage there is less bleeding, with a thicker mucosa, and there is prolapse which reduces itself. The third stage presents prolapse which must be reduced by the patient or physician.

Here we may digress to consider another condition called the pecten band, described by W. E. Miles[1] and L. A. Abel.[2] The old dictum "the anal sphincter is the last muscle in the body to relax under deep anæsthesia" prompted Mr. Miles to dissect the region to discover the cause. A band of fibrosis in the submucosa gave the explanation and as it was found in the region called the pecten he called it the "pecten band". The pecten is the area from the white line of Hilton, which represents the junction of hind gut and skin, up to the valves of Morgagni above, and is so named from its resemblance to a cock's comb. See Fig. 3.

Miles states that constipation gives rise to venous stasis and that venous stasis gives rise to fibrosis, just as we find fibrosis around a varicose ulcer or in Volkmann's ischæmic paralysis, and that the pecten band is the fibrosis resulting from this stasis in the anal canal. He demonstrates that this fibrous band is the reason for the failure of relaxation of the anal sphincter, and in his operations shows that after division of this band, pectenotomy, the piles tumble out of the relaxed anus.

Pectenotomy is the division of the submucosal fibrous ring. It is performed by holding everted the mucous membrane of the canal with the left index finger in the canal, while the mucous membrane and then the underlying fibrous band are incised with the scalpel. The cut margins are separated by a moist wool dressing and heal quickly. This band can be demonstrated in most cases of long-standing hæmorrhoids, and pectenotomy can be accomplished without division of any fibres of the external sphincter.

Pectenotomy is then the first step in the opera-

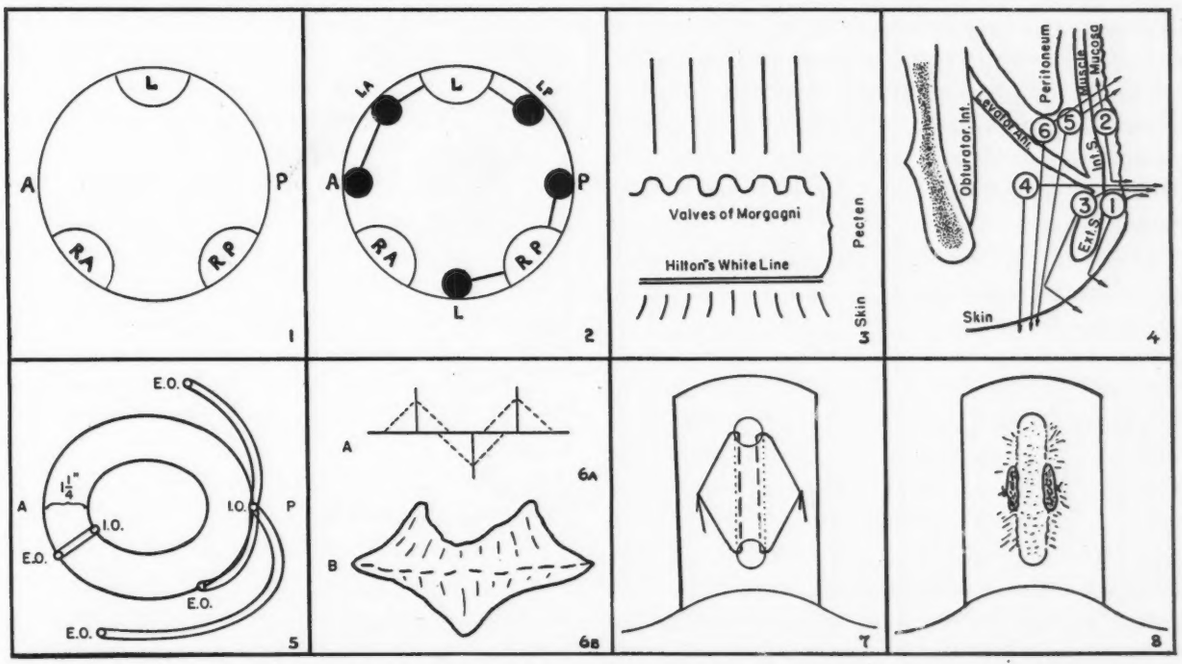

Fig. 1.—Situation of the primary piles. **Fig. 2.**—The primary and secondary piles. **Fig. 3.**—Situation of the pecten band. **Fig. 4.**—The numbers indicate the site of origin of the infection giving rise to the various fistulæ which correspond to the types as: (1) subcutaneous; (2) submucous; (3) subsphincteric; (4) ischiorectal; (5) pararectal; (6) pelvirectal. **Fig. 5.**—Course taken by subsphincteric and ischiorectal, and the relation of the external opening to the internal opening. **Fig. 6A.**—Incision with relieving cuts, with the corners to be removed indicated by dotted lines. **Fig. 6B.**—Type of wide granulating wound resulting from the incision A. **Fig. 7.**—Diagrammatic representation of ligatures passed along submucous fistula. **Fig. 8.**—Ligatures tied and the trough left when the intervening tissue has sloughed.

tive treatment of piles by those following this school of thought, and accomplishes more scientifically the same results as are obtained by other surgeons who dilate the anal sphincter and presumably tear this fibrous band as a preliminary to the operation.

The treatment of internal piles. — General measures include regulation of the bowels, replacement of prolapsed piles, and palliative applications, as ung. hydrarg. subchlor. The injection of sclerosing agents such as phenol, 10 per cent in almond oil, or quinine, 4 g., urea 2 g., water 30 c.c., into the submucosa results in an inflammatory reaction which squeezes out the dilated veins by fibrosis. The injection is into the loose tissue about the vein and is not intended to be into the vein. Injection will cure a certain percentage of first and second degree piles, but should not be expected to cure with certainty or permanence any but the earliest cases (Miles).

Injection is made, using either a slotted speculum so placed that the pile to be injected prolapses into the slot, or a round speculum, when all three primary piles will prolapse simultaneously at the upper edge of the speculum as it is slowly withdrawn. The injection should be made at the upper limit of the prolapsing pile and will be in the area above the white line which is insensitive to ordinary pain stimuli. A good light is essential, and some specula are fitted with distal lights. The mucous membrane should be cleansed, but any attempt to sterilize it is useless. The needle should penetrate the submucous coat but must not pierce the tunica propria recti. A guarded needle with a shoulder one-half an inch from the end facilitates the accurate placement of the injection. The injection must not blanch the mucosa or the tension may result in a slough. The oily solutions require a closer fit between the needle and syringe than the less viscid solutions, and special needles and syringes which lock together are helpful, for then only one hand will be required for the injection.

There are different plans of injection. One is to inject one primary pile area with 5 to 10 c.c. of the solution at weekly intervals, and another is to inject all three primary areas with 3 c.c. of the solution at weekly intervals. Five or six injections may be required to deal with all the involved areas. A firm palpable swelling at the site of the previous injection is indicative of a successful result. The patient usually experiences no disability and carries on with his daily routine.

Operation is the only cure for third degree piles and some of the cases of second degree piles. Only the principles of the various procedures may be mentioned.

1. Simple ligature, using a stout braided silk tied beneath a forceps placed on the pile area. The pile is tucked inside the anal canal and left to slough off, which it does in about eight days. At first this may appear as a most objectionable procedure, but after caring for hundreds of cases I have seen its virtues, and have met fewer complications than with any other method.

2. Dissection and ligature. The pile area is dissected up from the skin margin, transfixed and ligatured, and the ligated portion is resected. This is a neater looking operation and gives satisfactory results.

3. Clamping and oversewing. The pile area is clamped, and the redundant portion is resected and the clamp is oversewn with catgut and tied. The bleeding is controlled, but with numerous suture punctures submucous abscess is more liable to develop.

4. Clamp and cautery. This method is popular in the United States and gives satisfactory results.

5. Whitehead's operation of resection of the whole pile-bearing area of the anal canal as a cuff has one serious objection that it is frequently followed by anal stricture, and of late has fallen into disrepute except in selected cases.

Almost any general anæsthetic is satisfactory, but a low spinal of 0.8 c.c. of 1:200 percain, or intravenous pentothal sodium gives eminently satisfactory results. The operation is a painful one and sedatives should be administered freely. Sitz baths give most welcome relief of discomfort, and finger dilatation after the eighth to the tenth day is a useful procedure to prevent stricture. Daily anal irrigations and dressings of moist soft wool tucked in the anal canal assist in maintaining cleanliness. Post-operative bleeding may be controlled by the insertion of a hollow vulcanite tube, which allows passage of flatus and fæces and still compresses the veins.[8] Post-operative retention of urine may require special measures, and the use of doryl[4, 5] has been followed by dramatic results.

FISSURE IN ANO

Fissure should be suspected when a patient describes a pain in the anal region lasting for some

time after defæcation, and when anal spasm is encountered on rectal examination. The textbook "sentinel pile" may or may not be present. Ninety per cent of fissures occur in the mid line and posteriorly, and this is supposedly due to a decussation of the sphincter at this point, which leaves the mucosa unsupported.[6]

The fissure may be due to constipation, a prolapsing polyp, or a torn-down anal valve, and it gives rise to lasting pain, spasm, but little bleeding. It may be palpable or not, depending on the chronicity and induration of the margins.

Acute fissure with short history, without induration, may be cured by the injection of a slowly absorbed oily local anæsthetic as B.A.B.A. (Martindale) or proctocain (Allen & Hanbury) into the anal sphincter and fissure base. This provides rest, relief of pain and spasm, and allows the crack to heal. The injection is made through the skin close to the anal verge, and 5 to 10 c.c. of the solution are spread in a fan-shaped area into the sphincter and fissure base. This is usually accompanied by instantaneous and permanent relief.

Chronic fissure with indurated margins will only be cured by operative measures, such as pectenotomy with excision of the indurated margins, or the excision of a wide triangular area of fissure and perianal skin (Gabriel[8]), to allow the area to flatten out.

PRURITUS

After predisposing factors as diabetes, vaginal discharge, and the eczema diathesis have been excluded and local causes, as constipation, pecten band, blind internal fistula, pin-worms, piles, and eversion of the anal mucosa have received appropriate treatment the resistant case may be helped by various procedures. Locally, bi-daily perianal washing, using tepid water and pure soap, patting the area with a soft towel and applying a powder of zinc oxide, camphor and starch is soothing. A zinc and camphor cream is applied at night which contains camphorated oil, zinc oxide, anæsthesin, lanolin, and vaseline. Local applications of 10 per cent phenol in glycerine, or 25 per cent silver nitrate, are helpful followed by the cream. Artificial silk underwear should replace other forms. In more resistent forms pectenotomy, or the injection of 5 c.c. of oily anæsthetics as B.A.B.A. or proctocain in a fan-shaped area subcutaneously about the anus at weekly intervals should be tried. Strong solutions of alcohol have been injected into the subcutaneous areas,[9] and Bell's operation of dissecting the perianal skin from the underlying tissues, to cut the fine cutaneous nerve endings, has the same objective. Finally, a formal resection of the sensory branches of the inferior hæmorrhoidal nerves in the ischio-rectal fossa may occasionally be justified.

PROLAPSE

One must differentiate prolapsing piles, prolapse of the anal mucosa, and true prolapse of the rectum or procidentia recti. Prolapsus mucosæ presents a pink cuff all around the anal area and never exceeds an inch in length. There is always a relaxed sphincter and often moisture and pruritus. Palliative reduction, strapping of the buttocks, care at stool, and regulation of the bowels, with sphincter exercises, will cure mild cases. Sclerosing agents injected into the submucosa, or formal resection of linear areas of the redundant mucosa, being careful not to stenose the canal, will be necessary in resistant cases.

PROCIDENTIA RECTI

Part or the whole of the rectum and the full thickness of its wall may prolapse so that several inches are outside the anal ring. The peritoneal cul-de-sac in front of the rectum may be carried down and contain bowel which may be felt to gurgle on examination. The condition may be differentiated from intussusception with a probe, as there is no groove going up the anal canal parallel to the prolapsing segment. Prolapse of a new growth may be distinguished by the appearance of the prolapsed part. Treatment must be operative, and a number of procedures have been advocated. Artificial production of anal stenosis has been used to prevent this prolapse but is usually unsatisfactory. Lockhart-Mummery has used approach to the posterior of the rectum, packing gauze in the area between the rectum and sacrum. As the packing is gradually removed adhesions form which support the rectum. Intraperitoneal fixations of the sigmoid and rectum have been unsatisfactory. Formal resection of the prolapsing segment with end-to-end suture is the surest cure. One operation referred to by Miles as rectosigmoidectomy has given satisfactory results with 3 per cent mortality in the severest cases.[10]

ANO-RECTAL FISTULA

This is undoubtedly the most difficult problem encountered among the common rectal condi-

tions. The high percentage of recurrences testifies to the inadequacy of treatment and lack of appreciation of the fundamental principles essential to cure. The most complete monograph covering all the details of this subject is by Miles. A fistula is by definition a communication between one epithelium-lined surface and another. A sinus is by definition a tract leading from an epithelium-lined surface into the tissue depths. There is by common usage a certain leniency in grouping all tracks in the anal region as ano-rectal fistulæ, though strictly speaking some of them are sinuses. An ano-rectal fistula must be differentiated from urethral fistula, sacro-coccygeal sinus, pilonidal sinus, suppurating dermoid, and suppurating presacral glands. Fistulæ-in-ano are due to preceding suppuration in definite lymphatic areas, most frequently in the rectum or anal canal from cryptitis, fissure, or thrombosed internal pile. The suppuration ends in abscess formation, and the path taken by the discharge of the abscess forms the track of the fistula. The type of fistula depends on the site of the original abscess and is named accordingly. They are thus classified as (1) subcutaneous; (2) submucous; (3) subsphincteric; (4) ischiorectal; (5) pararectal; (6) pelvirectal. (See Fig. 4). If the opening is on the external skin surface only, it is blind external, if in the anal canal only it is blind internal, and if in both areas it is complete. This is made clearer by a study of the accompanying drawings which indicate the original abscess site as a circle and the tracks in heavy lines. (See Fig. 4). The type of fistula is diagnosed by the relative positions of the internal opening (i.o.) and external opening (e.o.) and by the findings on passing a grooved director along the track. The following rules assist in differentiating the types. These rules are based on anatomical considerations, such as fascial planes which limit the extension of the infection and on the direction of lymphatic drainage in the different areas.

1. If the e.o. is less than one inch from the anal verge it is a subcutaneous or subsphincteric fistula.

2. If the e.o. is at the anal verge and the track is directly into the depths, and the margins of the groove in the groove director may be felt with a finger in the anal canal, it is a submucous fistula.

3. If the director passes deeply, but the margins of the groove cannot be felt, it is pararectal, pelvirectal or ischiorectal.

4. If the i.o. of a deep fistula is above the levator ani it is pararectal or pelvirectal.

5. If there are multiple openings and the tracks lead deeply it is probably ischiorectal or pelvirectal.

6. If it is ischiorectal the e.o. is more than one and one-quarter inches from the anal verge, and if there is an internal opening it is in the midline posteriorly between the sphincters, and the track takes a curved course from the external opening to the internal opening, as indicated. (See Fig. 5).

7. If it is subsphincteric the e.o. is less than one and one-quarter inches from the anal verge. If the e.o. is posterior to the transverse anal line the track takes a curved course from the e.o. to the i.o. which is in the midline posteriorly between the sphincters. (Goodsall's rule). See Fig. 5.

8. If the margins are widely undermined with little acute inflammatory reaction it is probably of tuberculous origin.

Treatment.—The principle in treatment is the conversion of a tunnel into a trench, and frequently this means laying the track open into the anal canal. But it is courting disaster to lay open all fistulæ into the anal canal, as if this is done in the pelvirectal or pararectal forms incontinence will result. The external sphincter muscle may be divided without causing incontinence, but the insertion of the levator ani muscle into the sphincters cannot be cut without incontinence resulting. Skin edges must be kept from uniting until the base has granulated to a flat level surface. To achieve this the surface area of the wound must be made very large so that epithelialization from the margins will not meet to cover the wound until the granulating base has filled in the trench. This is accomplished by making relieving cuts (see Fig. 6), after which corners of skin are removed to increase the surface area of the wound. The only time a fistula should be packed is at operation, to control oozing. At later dressings a thin moist gauze piece is laid over the granulating surfaces, to prevent "bridging" but is not packed tightly. Sitz baths and daily irrigations and dressings are important in post-operative care.

Special features in treatment.—SUBMUCOUS FISTULA. To prevent oozing from the vascular

mucous membrane the mucosa is not cut but is doubly ligatured with stout silk sutures passed along the track from one end to the other. (See Fig. 7). The narrow strip between the ligatures sloughs and unroofs the track without bleeding. (See Fig. 8). Subsequent finger-dilatation prevents bridging before the area has granulated into a flat healed wound.

Pararectal and pelvirectal fistulæ. These must never be laid open into the anal canal. The track is followed through the ischiorectal fossa above the levator ani, which should be divided in the direction of its fibres and not across them. This opening above the levator must be kept open until the granulations have filled in this space, after which it is dealt with as an ischiorectal abscess. The small internal openings are not dealt with, as they close when adequate drainage is effected to the outside.

Subsphincteric fistulæ. These are dealt with by division of the external sphincter muscle, laying the track open into the anal canal, and without interference in the function of the sphincter mechanism.

Carcinoma

Carcinoma of the rectum is also a relatively common condition, and where rectal conditions are discussed it should never be forgotten. The operability rate which in my personal experience in this community has been closely followed and which has been below 30 per cent is testimony to the truth of the old dictum "more mistakes are made by not looking than by not knowing". It might not be inopportune to remind the physician that he can wash his finger, but not his reputation.

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RENAL HYPOPLASIA WITH PYELITIS CYSTICA AND URETERITIS CYSTICA*

By David W. MacKenzie and Henry J. Tweddell

Montreal

CYSTIC disease of the renal pelvis, ureter and urinary bladder has long been recognized, as has the fact that the condition rarely produces clinically recognizable phenomena, but among pathologists and surgeons its etiology, occurrence and evolution have been much in dispute. On the other hand, to date, the authors have yet to find, in a review of the literature, the above condition occurring with renal hypoplasia.

Our information on pyelitis cystica and ureteritis cystica has been obtained largely from a review of the literature by Harry D. Morse[1] and also from Victor C. Jacobson's case reports;[2] that regarding renal hypoplasia from an article on renal aplasia and hypoplasia by David W. MacKenzie and Allan B. Hawthorne,[3] on modern urology by Cabot,[4] and on urological roentgenology by Wesson and Ruggles.[5]

Etiology of Cysts of the Urinary Tract

Literature regarding the pathogenesis of cysts of the urinary tract is abundant, but all explanations so far put forth may be divided into three main groups. Group 1.—That the cysts are parasitic in nature. Group 2.—That the cysts are derived as retention cysts from pre-existing glands in the pelvic, ureteral and vesical mucosa. Group 3.—That the cysts originate from the cell "nests" of von Brunn.

The parasitic theory.—That the cysts are due to parasites namely, Eve's psorosperms, Sutton's coccidium oviforme, and so on. Conclusive doubt upon this theory was firmly established by Gilchrist, who showed that degeneration of epithelium gives rise to particles which simulate, and have been called, psorosperms, organisms of blastomycotic dermatitis and other allied affections.

The retention cyst theory.—That the cysts are retention cysts from pre-existing glands in the mucosa of the ureter or bladder in which a catarrhal inflammation usually existed, and which was regarded as the cause of blocking of the gland ducts. Though older textbooks of his-

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tology mentioned the normal occurrence of mucous glands in the upper third of the ureter, recent opinion is that glandular structures are not normally found in the urinary tract above the trigone of the bladder, and what gland-like formations have been found are due to proliferation of the surface epithelium or excessive infolding of the mucosa.

The cell "nest" theory of von Brunn.—Based on the theory that cysts of the urinary tract are derived from groups of epithelial cells which have become isolated from the lining mucosa and lie in the tunica propria, these epithelial groups are known as the cell "nests" of von Brunn, the investigator who gave them the first careful consideration.

The age-incidence in which von Brunn cell nests may occur is not established, though it is a striking fact that 95 per cent of the cases occur after the 50th year, and a large number in the seventh and eighth decades; the sex incidence being about equally divided. Jacobson was unable to find epithelial cell nests in any of 10 levels of each ureter taken from infants 5 days to 18 months of age. Marwold, however, reported a case of ureteritis cystica and cystitis cystica in a new-born child. Although Markwald and Aschoff assert that inflammation is not a pre-requisite to the formation of cell nests and buds we believe that more recent opinion favours the association of inflammation with epithelial cell nests and cystic disease.

THE ETIOLOGY OF RENAL HYPOPLASIA

Renal hypoplasia, renal aplasia, and congenital absence of one kidney are frequently confused. They represent an embryonic defect or lack of development during intra-uterine life when the organ in its evolution did not develop to its full extent, or the Wolffian duct of the mesonephros failed to produce a renal bud after the duct had reached the cloaca. Congenital hypoplasia is a result of arrested development, and may occur at any stage of development. Cabot states

> "In true unilateral hypoplasia we have a kidney diminutive, fetal or infantile in size, which may either be apparently well developed anatomically and histologically, or defectively developed in its internal structure, with absence of pyramidal substance, or with only rudimentary glomeruli and tubules. While apparently having good secretory function in regard to elimination of urea or colour dye, the organ lacks capacity to undergo functional hypertrophy if called upon to do all the work of two kidneys, particularly when the kidney of the opposite side is removed for associated pathology."

The inherent danger in a small hypoplastic kidney as first called to attention by Albarran, later by McArthur in 1911, and again by MacKenzie and Hawthorne[3] in 1928. Though a hypoplastic kidney may have a normal urine secretion, good urea excretion and phenosulphonephthalein elimination with diminished or normal renal function, it is conclusive that it is incapable of undergoing compensating hypertrophy after nephrectomy of its mate. Thus during every kidney operation, whether of a plastic nature, a nephrotomy or pyelotomy, or a nephrectomy, there arises the question: what is the condition of the opposite kidney? Can it carry on if this one is removed, or while it is temporarily functionless due to the trauma of handling?

It is stated that the hypoplastic kidney is usually not more than one-sixth to one-third the size of the opposite kidney, which is usually hypertrophic. Two types have been described.

1. A kidney in which the parenchymal architecture is normal, with a normal functioning pelvis and ureter, but greatly undersized; the pelvis somewhat pear-shaped anatomically, and the calices more or less disoriented, but able to function physiologically.

2. An infantile kidney in which the medullary portion and the pyramids are absent, hence only cortical substance is present and the pelvis may be of hydronephrotic type. In some cases microscopic study reveals only rudimentary glomeruli and tubules; in others the tissue resembles normal kidney parenchyma, but is present in minimal amounts.

Cummings and Schroeder state that the terms renal atrophy and renal hypoplasia should be quite sharply demarcated. Atrophy merely means a reduction in the size of an organ and does not itself suggest any etiological factor. Thus atrophy may be a proliferative atrophy or a replacement atrophy. Hypoplasia is an incomplete development of the kidney due either to a lessened number of unit structures or a decrease in the size of the individual cellular elements. It is always congenital, since an acquired decrease in number of unit structures would indicate a condition of pathological significance, whereas hypoplasia is not necessarily indicative of disease. It must also be kept in mind that many times secondary atrophy (due especially to obstruction or infection) is superimposed upon hypoplasia, the latter being purely congenital.

Herbst and Apfelbach separated their cases into two simple groups, first, that comprising all kidneys altered from a normal status by hypoplasia or aplasia of the metanephric mass, and, second, all kidneys altered by acquired disease such as inflammation, persistent circulatory disturbance, trauma, and obstruction with hydronephrosis. They pointed out, however, that it is difficult to separate the atrophic from the hypoplastic kidney in the light of current nomenclature. The atrophic element in the combined picture may be in fact due to a congenital malformation entirely, such as a blind ureteral bud.

Cabot presents the following two tables to facilitate the differentiation between true renal hypoplasia and renal aplasia.

Renal Hypoplasia

1. Kidney, small or infantile in type; the other kidney hypertrophic.
2. Normal renal parenchyma. (*a*) With medullary substance. (*b*) With absence of pyramidal substance.
3. Microscopic sections reveal normal or rudimentary glomeruli and tubules.
4. Rudimentary or hydronephrotic pelvis.
5. Calices bizarre in position and size, sometimes absent.
6. Patent ureter.
7. Normal urine secretion.
8. Diminished or normal renal function.
9. Good urea and phenosulphonephthalein elimination.
10. Pyelography and roentgenology reveal a hypoplastic kidney or diminutive organ.

Renal Aplasia

1. No true kidney present.
2. No evidence of renal pelvis.
3. Absence of true renal pedicle.
4. Renal artery small or absent.
5. Ureter incompletely developed and not patent.
6. No excretion of urine.
7. No renal function.
8. Bladder with two normal ureteral orifices or one ectopic ureter.
9. Histological section of the supposed renal mass reveals glomeruli and tubules, showing arrest of development of the renal organ.
10. Cystoscopy, catheterization of the ureters, and descending or ascending pyelography, serve for diagnosis of the condition.

Degrees of renal hypoplasia are many, from the moderately infantile organ down to a minute functionless mass of kidney tissue, barely recognizable in the pyelogram or upon microscopic examination, a condition more properly termed renal aplasia.

Case Report

Mrs. C.R., 59, was admitted to hospital on November 22, 1936, complaining of dull pain in the right loin of three years' duration; pain down the outer side of right thigh of five weeks' duration, and nocturia (nine) for the past five or six weeks.

Two weeks prior to admission the pain in the right loin radiated forward and downward to the right lower quadrant, and was associated with some degree of frequency and dysuria, some fever, but no chills. At that time she was confined to bed and since had had the dull pain in the right loin, aggravated by fatigue, relieved by rest, and with occasional radiation to the right lower quadrant. Urinary frequency: day 3 to 5 plus; night 1 plus. She gave a history of occasional incontinence on exertion, coughing or sneezing. No history of chills; fever as mentioned above. No history of hæmaturia, passage of sand, gravel or calculi.

Previous history.—Irrelevant.

Family history.—Irrelevant.

Functional inquiry.—Revealed symptoms of a mild hypertension.

Physical examination.—Positive findings on physical examination were as follows: Slight enlargement of the thyroid gland with fine tremor of outstretched fingers; moderate enlargement of the heart to the left with a soft systolic blowing murmur heard over the whole præcordium, but best heard at the apex; moderate sclerosis of the radial arteries; blood pressure, 176/94; slight tenderness in the right costo-lumbar angle.

The urine was hazy, straw coloured; specific gravity 1.018; albumin, a heavy trace; sugar, none. Microscopically, scattered epithelial cells and occasional white blood cells were present, but no red cells. One c.c. of phenosulphonephthalein intramuscularly gave: first hour 50 per cent; second hour 15 per cent; total 65 per cent.

Blood examination gave: red blood cells 4,800,000; white blood cells 6,000; hgb. estimated at 90 per cent.

Cystoscopic examination, November 23, 1936. The cystoscope was readily introduced and examination revealed the bladder mucosa to be the seat of an old chronic inflammatory condition (cystitis cystica). The right ureter was catheterized for about one-third of the distance; the left, to the renal pelvis.

Specimens	*Right*	*Left*
Macroscopic	blood-tinged	clear
Volume	2 c.c.	4 c.c.
Urea	very faint trace, if any	0.002
Microscopic	scattered red blood cells	a rare white blood cell

X-ray with catheters in position showed the right catheter about one-third of the way up the ureter, with a small indefinite shadow just above it. No other shadows seen. The left catheter passed up to normal pelvis; a large kidney shadow on the left side.

Intravenous uroselectan series.—Prompt excretion on the left side; no secretion on the right side. The right side showed a relatively normal-looking kidney shadow, low, with just a suggestion of a ureter. The left showed a good large kidney shadow with a normal pelvis. In the lower portion of the right ureter there was just a suggestion of a shadow, as seen on previous examination.

Diagnosis.—Right ureteral calculus (junction of middle and lower third of ureter); right hydronephrosis with non-functioning kidney.

Three days following the patient was re-cystoscoped. A French 8 olive-tipped catheter was introduced into the right ureter, obstruction being met with in the lower third as on the previous examination, but with some difficulty the obstruction was overcome and a small specimen obtained. The patient experienced so much pain that a pyelogram was not obtainable.

Specimen	*Right (flushed)*
Macroscopic	clear
Volume	1.5 c.c.
Urea	absent
Microscopic	scattered red blood cells

X-ray with catheter (right) in position did not show any shadow.

The patient had a chill (104°) following the second cystoscopic examination. This subsided within two days and she was discharged somewhat improved, to return in two weeks if she did not pass the calculus. She was re-admitted to hospital, January 11, 1937, with complaints similar to those on her previous admission; no calculus had been passed in the meantime.

The urine was hazy, amber-coloured, acid in reaction, specific gravity 1.012; a faint trace of albumin, no sugar. Microscopically a few epithelial cells, scattered white blood cells and a rare red blood cell were present.

One c.c. of phenosulphonephthalein intramuscularly gave: first hour 30 per cent; second hour 20 per cent; total 50 per cent.

Blood examination gave: red blood cell count 4,780,000; white blood cell count 6,200; hgb. 80 per cent. Blood grouping: Group II (Moss classification).

Cystoscopic examination.—The cystoscope was easily introduced. The right ureteral orifice still had a suggestion of a non-functioning orifice. A ureteral catheter was introduced and met with obstruction in the same position as on previous admission, namely, at the junction of the lower and middle third. X-ray with the catheter in position, showed the catheter in the lower third of the ureter, but no evidence of calculus was seen.

In view of the fact that the patient had continuous pain in what appeared clinically to be a non-functioning kidney for some time, operation (right nephrectomy) was decided upon.

Operation report.—A curved right loin incision; much perirenal fat. The kidney was situated high up under the ribs with a pulsating artery and several small veins in the pedicle. At the upper and lower poles were two fairly large cysts. The ureter was small, irregular, and apparently non-functioning. The ureter was freed to the brim of the bony pelvis, ligated, and severed with the cautery between ligatures. The pedicle was then cut and ligated, and the specimen removed for examination. The wound was closed in the usual manner.

The patient made an uneventful recovery and was discharged with absence of symptoms, a phenolsulphonephthalein excretion of 50 per cent, and normal urinary findings.

Pathological examination.—The kidney was small, measuring 26 cm. from pole to pole, and 12 cm. across. The surface was smooth and the capsule stripped with ease. The upper pole formed a round cyst measuring 4 cm. in diameter and containing a clear whitish fluid. A similar cyst was situated on the lower and lateral border of the kidney. It measured 2.5 cm. and contained a similar fluid (Fig. 1). On section the parenchymal architecture appears normal but greatly undersized. The calices are more or less disoriented (Fig. 2).

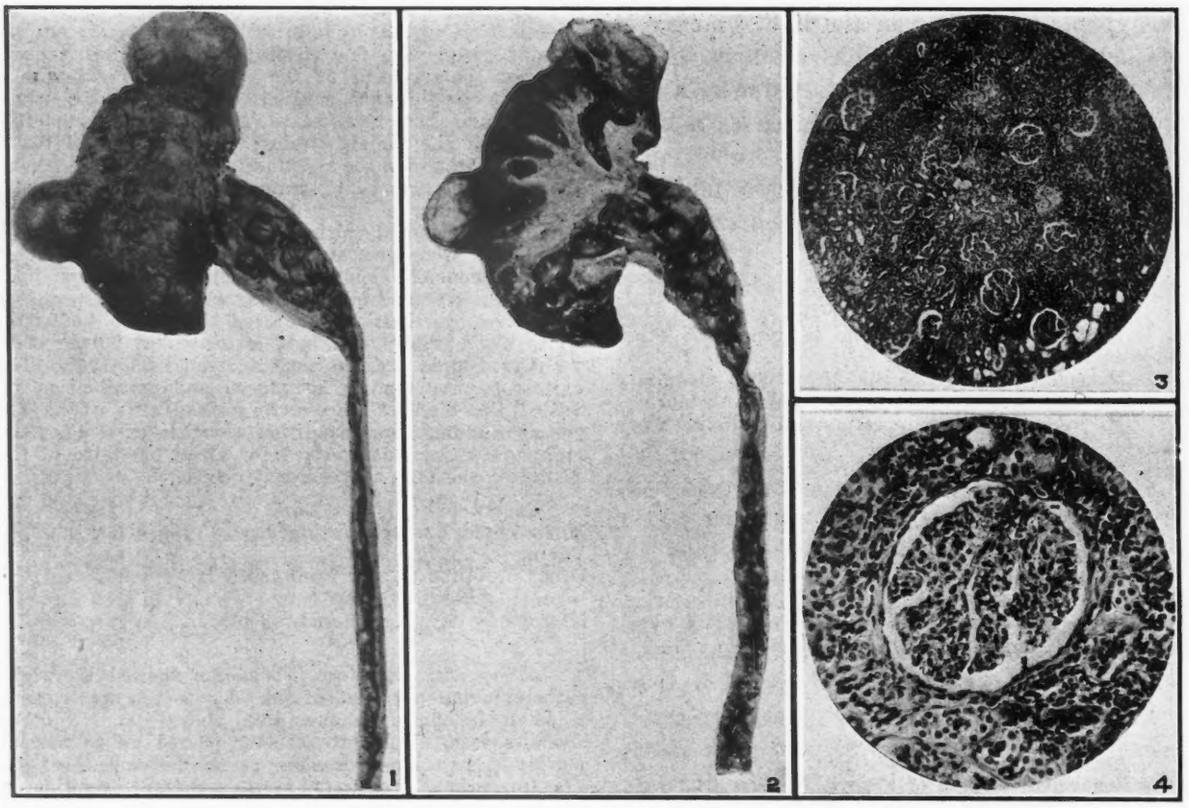

Fig. 1.—Right kidney and ureter. The kidney is hypoplastic and presents two fairly large cortical cysts. **Fig. 2.**—Half section of kidney and ureter showing interior of the cortical cysts, the parenchymal architecture markedly undersized and the calices disoriented. Pelvis, pear-shaped. The pelvis and ureter show the extent of cyst formation. **Fig. 3.**—Showing glomeruli in various stages of degeneration. One glomerulus is completely fibrosed (x45). **Fig. 4.**—A glomerulus showing a marked sub-capsular space and thickening of the Bowman's capsule (x200).

The pelvis measured 3 cm. across. It was smaller than normal and somewhat pear-shaped. Palpation of the pelvis gave a tactile sensation of calculi being present. On section the pelvic fat was shown to be greatly increased. Studding the internal surface of the pelvis were many papillary bodies varying in size from a pinhead to that of a small pea.

The ureter was firm and on palpation revealed the same tactile sensation as did the pelvis, namely, the sensation of calculi being present. Under slight pressure a small probe could be passed up the ureter. On section the ureteral mucosa revealed similar cystic bodies. The ureter was definitely thickened.

Microscopical examination.—The renal capsule was not appreciably thickened; cortical substance was present but in minimal amount. Glomeruli were present, but few in number, some showing definite fibrotic changes, others hyaline changes (Fig. 3). The subcapsular space about several of the glomeruli was considerably increased, and Bowman's capsule was thickened (Fig. 4). The two large cortical cysts previously described showed no other features than those of a fibrous tissue cyst wall with

Fig. 5.—Showing normal epithelial lining of the calices. **Fig. 6.**—Section through the tip of one of the calices showing marked round-cell infiltration (x45). **Fig. 7.**—Section showing cystic degeneration and round-cell infiltration in the kidney substance (x55). **Fig. 8.**—Showing cystic degeneration and round-cell infiltration. The cysts are filled with colloid material consisting of nuclear fragments and cellular debris (x55). **Fig. 9.**—Showing dilatation of some of the tubules (x200). **Fig. 10.**—Longitudinal section of the ureter showing thin-walled cysts filled with colloid material in which are bodies consisting of nuclear fragments and debris. **Fig. 11.**—Showing normal ureteral epithelium with colloid material of a ureteral cyst above. **Fig. 12.**—Showing normal ureteral epithelium and atrophy of the myo-ureter (x160).

round-cell infiltration (Fig. 7). Medullary substance was present but also in decreased amount (Fig. 9). Cystic degeneration and round-cell infiltration were marked, the latter especially so throughout the section (Fig. 5). A moderate degree of interstitial fibrosis was present throughout.

There was atrophy of some groups of convoluted tubules, dilatation of others (Fig. 6). Some of the collecting tubules contained polymorphonuclear leucocytes. A moderate degree of hydronephrosis was indicated by the dilatation of the collecting tubules and accumulation therein of albuminous fluid. The large arteries showed definite fibrotic changes (Fig. 8).

Sections from the cystic portion of the renal pelvis and ureter presented a similar picture (Fig. 12). The projecting cysts were lined with a type of low cuboidal epithelium in two or three layers along the base, but only a thinned-out single layer at the greater part of its inside circumference. The contents of the cysts were more or less homogeneous eosin-staining material, showing a partial retraction from the cyst walls (Fig. 11). In the homogeneous eosin-staining material were numerous round or elliptical bodies with dark pyknotic inclusions suggesting nuclear fragments. Many degenerated epithelial cells and desquamated normal-looking cells of the lining appeared along the periphery. A thin connective-tissue envelope with no definite epithelial elements surrounded the cysts.

Areas of chronic inflammation were evidenced by the presence of marked round-cell infiltration. Imbedded in this inflammatory tissue were numerous "nests" of epithelial cells, some directly below the mucosal surface, others connected to it by a strand of epithelial cells. Most of the nests lay isolated in the tunica propria. The nests varied in number. There was atrophy of the circular and longitudinal muscles fibres, the muscle fasciculi being invaded by connective tissue (Fig. 10).

The cell nests have no true basement membrane nor any of the characteristics of true glandular structure.

SUMMARY

1. Two separate clinical entities occurring in one and the same organ namely: (*a*) a cystic inflammation of the pelvis and ureter; (*b*) an embryonic defect or lack of development during intra-uterine life.

2. The epithelial buds and cell "nests" of von Brunn are inflammatory in nature, as evidenced by the round-cell infiltration being a constant feature in those cases reported in the literature and in the case presented.

3. Cysts of the urinary tract are formed from the epithelial nests of von Brunn.

4. Cystic disease of the urinary tract is primarily a disease of old age, occurring in persons of either sex in whom a history of urinary tract disturbance or definite inflammation can be elicited. The condition is reported to have occurred in several cases of double ureter, and from our case it might be added that the condition may occur in conjunction with congenital renal hypoplasia.

5. We admit that the proliferative renal fibrosis, chronic pyelonephritis with interstitial and glandular degeneration met with in our case may well be termed "renal atrophy". However, our assumption is that these changes represent a secondary atrophy superimposed upon hypoplasia, the latter being purely congenital.

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MALIGNANT MELANOMA IN THE COLOURED RACES: REPORT OF A CASE ORIGINATING IN THE MOUTH*

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ALTHOUGH this disease was mentioned by Hippocrates it was not until 1806 that Laënnec used the term "melanoma", and described it as an unusual type of cancer. Since then the etiology of this neoplasm has aroused much controversy.

Within recent years several authors have drawn attention to the rarity of malignant melanoma in coloured races. However, a review of the literature reveals that it is more common than hitherto supposed. Gilchrist[3] reported a case in a negro, which originated in a small, slightly elevated, very black spot on the sole of the foot. Rapid growth began after it was shaved with a razor. In a series of 12,000 patients among deeply pigmented oriental people and negroes, Wieting and Hamdi, in Constantinople, recalled only 6 melanotic tumours; 2 on the foot, 2 originating in the eye, 1 on the cheek and 1 in the gall bladder. Stevenson described 18 cases in Hindus, all but 3 of which originated on the sole or heel. A history of trauma was frequent since the Hindus usually go barefoot. Hazen noted a melanoma which

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followed injury to a mole on the sole of the foot with a nail. Adler and Cummings recorded a similar case in a native of Sierra Leone. Sutton and Mallia[9] reported a case in a negress of seventy-eight years which first appeared on the toe. From personal correspondence with dermatologists in the southern part of the United States they were able to collect 6 other cases; 3 of which were on the foot and 3 which originated on the ankle, thumb and forehead respectively. Bauer described 2 cases in the negro, 1 on the thumb and 1 on the toe. Des Ligneris[2] reported 17 cases of melanoma among 13,170 native patients in northern Transvaal. In his series all the tumours occurred on the skin of the foot or leg, except one case of uveal melanoma. He believed that the course of the disease is somewhat slower in negroes than in white persons—though ultimately fatal. Dickson and Jarman added a case of subungual melanoma in a negress who for twenty years had noticed a black spot under the nail of her little finger. Bishop[1] found that while carcinoma of the breast and cervix was as frequent in negroes as in white people melanoma was much less common. Of 5,663 pathological specimens, 70 were melanotic tumours and, of these, 9 were in negroes. Six were on the lower extremity, 2 were situated on the face and 1 originated in the eye. Simpson, of the South African Institute for Medical Research, reported 30 melanomas in Europeans and 22 in natives from among 8,732 pathological examinations. The chief location in the negro was on the lighter pigmented part of the foot. Pack, in reviewing 246 cases of melanoma, found 3 in negroes. One was situated on the plantar surface of the foot, 1 on the hand, and 1 on the mucous membrane of the superior alveolus. The latter is remarkable, since it is the only melanotic tumour which has been reported in the mouth in the negro; while over 50 cases have been observed in Caucasians. Sequeira and Vint found 67 melanotic tumours among 2,228 pathological specimens examined at the native hospital in Nairobi. The foot was the commonest site and the majority were on the plantar surface. Butterworth and Klauder collected a series of 50 melanomas at the Philadelphia General Hospital, of which 6 were in negroes. Hewer[5] found 47 melanotic tumours among 2,500 pathological specimens from natives of the Sudan. Over half the lesions were situated on the foot, and he attributed a significant rôle to trauma in the causation. Three cases of malignant melanomas in negroes have been reported by Quinland. In one the original site of the tumour could not be determined because of widespread metastases. The other cases occurred respectively on a finger and in the nostril. Herold and Moustardier have each reported a case recently, the former on the hand of an American negro, and the latter on the foot of a native of Madagascar.

In man, melanin appears to provide protection against strong actinic rays, hence the deepened colour of the skin when exposed to sunlight and the intense colour of the negro. It has been estimated that the entire skin of the negro does not contain more than one gram of melanin. The pigment is formed by the melanoblasts which are peculiar branched cells intercalated among the basal cells of the Malpighian layer of the skin. These produce an oxydase ferment capable of transforming the colourless chromogenic material in the blood into melanin. Some of the pigment is transferred to connective-tissue cells in the dermis, the chromatophores.

The etiology of malignant melanoma has aroused much controversy, and the following table modified from Dalla Favera classifies the opinions of some investigators.

1. *Arises from epidermis.* — Durante, Unna, Gilchrist, Whitfield, Kromayer, Marchand, Abbaser, Broders and MacCarty.

2. *Originates from mesoderm.*—(*a*) Young connective cells.—Simon, Virchow, Riecke. (*b*)—Proliferation of lymphatics.—v. Recklinghausen, Lubarsch, Herxheimer. (*c*) From endothelium and perithelium of blood vessels.—Pick, Jadassohn. (*d*) From sheaths of nerve fibres.—Soldan.

3. Arises from specially characterized cells of mesodermal origin—chromatophores.—Ribbert, Symmers.

Most malignant melanomas arise in a nævus (benign melanoma) of the skin or from abnormal deposits of pigmented cells. Older theories must be discarded in view of the work of Masson,[7] who has shown that the nævus is a proliferation of the entire end-apparatus of the sensory nerves of the skin, in particular the cells of Meissner's corpuscles in the dermis. It would appear that the nævus cell is neuroectodermal in origin. The type-cell may be non-pigmented and associated with nerve-endings, or it may be pigmented and not related to nerve-endings. The former is the nævus cell and the latter is the melanoblast. The degree of pigmentation depends on whether the melanoblasts or nævus cells preponderate, and bears no relation to possible malignancy. The neural origin of nævi would bring them into relation with neurofibromatosis, and pigmented patches of skin are often seen in this condition. Ferguson has

noted that intermedin could be recovered from tumour tissue and blood of persons suffering with melanotic tumours.

When a nævus is undergoing malignant change the tumour cells are extending into the deeper tissues, the cells are larger, the nuclei are hyperchromatic and mitotic figures are present. The tumour varies in appearance and may simulate a carcinoma, sarcoma, endothelioma, or lymphosarcoma. Some tumours may present in various parts features suggesting each of several types, and are classified as transitions. Matas, who called attention to the rarity of malignant melanoma in the negro some years ago, believed that pigment-production is a normal function of the negro skin and is under a well developed physiological control, while in the Caucasian pigment is limited to a few scattered areas and its physiological control is poorly developed. In the negro pigment is evenly distributed over the entire body with the exception of the palms of the hands and soles of the feet, which show a lesser degree of pigmentation. In those of mixed blood one often finds areas of darker pigmentation and, in some, freckles are numerous. According to Reiche about half of negroes, Indians, Arabs and Chinese have pigmented areas in their normal oral mucosa.

The development of melanotic tumours in the coloured races has been attributed to various predisposing factors. Ewing has suggested the possibility that perhaps more of the benign nævi would be seen in the negro but for the difficulty of observing them. Further, many nævi do not become apparent until adult life. Though most nævi do not develop into malignant growths they have a potential tendency to malignancy and may, due to some stimulus undergo proliferative neoplastic changes. Many authors have reported the relation of trauma to the development of melanotic tumours. For example; removing a mole with a razor, a blow on a mole, repeated scratching of a mole, development of a neoplasm in an old scar. Several of these investigators who have recorded numerous cases among the natives of South Africa found that the majority of the tumours originated on the lower extremity, particularly on the sole of the foot, in people who walk barefoot in a country abounding with thorns and sharp stones, and they assume this to be fairly strong evidence for the significance of trauma in their causation. It is also claimed that the coloured races are prone to develop melanotic tumours in areas where there is transition from dark to lighter pigmentation, such as the sole of the foot, about the nails of the fingers or toes, and the mouth.

Of 224 cases of malignant melanoma in the coloured races collected from the literature, sufficient data were available for analysis of the regional distribution of 170.

TABLE I.

Site	*Number*	*Percentage*
Foot	111	65.3
Lower extremity (exclusive of foot)	16	9.4
Trunk	4	2.4
Upper extremity	13	7.6
Head and face	8	4.7
Eye	16	9.4
Mouth	1	0.6
Gall bladder	1	0.6
Total	170	100.0

From Table I it is evident that the foot is the most common site of melanotic tumours and the majority occur on the plantar surface. Since so many of the cases were among natives of South Africa, it is probable that constant trauma caused by walking barefoot in a country abounding with sharp stones and thorns is an important etiological factor. The lower extremity (exclusive of foot), eye, upper extremity, head and trunk were next in order of frequency. Only one instance was found in the mouth and one in the gall bladder.

As Table I shows malignant melanoma to be extremely rare in the mouth of the negro, the following case which originated on the mucous membrane above the upper left incisor teeth is described.

CASE REPORT

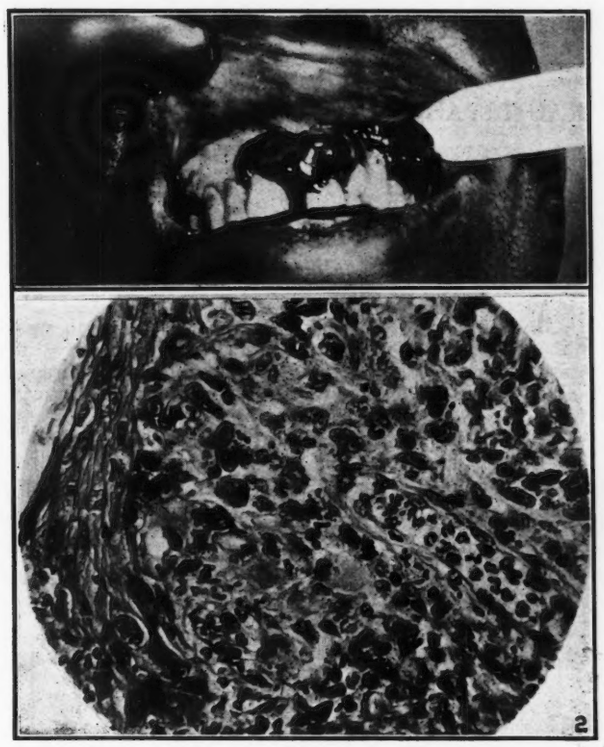
D.C., a very dark skinned male negro, aged 51 years; admitted May 30, 1938.

Personal and family histories were irrelevant.

About a year ago the patient noticed a bluish-black mass about the size of a pinhead on the mucous membrane of the alveolar ridge above the upper left lateral tooth. It was only slightly elevated above the surface of the gum. He stated that he could not remember any particular trauma on the region from which the tumour started to grow. The mass grew slowly and steadily without causing symptoms until two weeks before admission, when rather free bleeding occurred from it and this had recurred at intervals since then. For the two weeks he had experienced severe spasms of pain over the entire left side of the face which lasted for several minutes and recurred frequently during the day. Ten days ago a mass about as large as a marble became detached from the tumour while he was eating. There were no other symptoms except the inconvenience caused by the bulk of the tumour during mastication.

Physical examination.—Temperature 98.6°; pulse 80; respirations 22. A well developed and well nourished negro male who appeared to be about the stated age, and who was lying comfortably in bed. His skin was almost coal black in colour.

In the mouth there was a bluish black mass of firm consistency which extended from the right upper central tooth to the left upper first molar and from the gingival margin to the muco-buccal fold. The surface of the tumour was irregular and lobulated, and was elevated about 0.5 cm. above the mucous membrane. In the cuspid region part of the growth had sloughed off, leaving a defect which revealed loss of the alveolar process in this region. On the hard palate was a similar mass which extended from the right central to the left molar and 1 cm. onto the hard palate from the lingual surfaces of the teeth which also was raised about 0.5 cm. above the adjacent normal tissue (Fig. 1). The teeth in the



vicinity of the mass were loose. The breath was very fetid. The oral mucosa showed a number of scattered areas of pigmentation such as one frequently finds in the negro. The tongue, tonsils and pharynx were not remarkable. On each side of the neck in the submaxillary triangle was a firm, discrete palpable gland about the size of a marble, which was freely movable and not tender.

Glandular system.—Thyroid not enlarged. Axillary, epitrochlear and inguinal lymph glands were not palpable.

Respiratory system. — Though no positive clinical findings were noted, an x-ray of the chest showed a mass about the size of a golf ball in the lower lobe of the right lung.

Cardiovascular system. — Heart slightly enlarged beyond normal limits; the heart sounds well heard. A soft systolic murmur was heard at the apex. Blood pressure 140/80. The pulse was regular in rate and rhythm; volume good and tension well sustained.

Abdomen.—No splinting or tenderness. The liver, kidneys and spleen were not palpable. Hernial orifices intact; normal genitalia. No abnormal masses were palpable.

Nervous system.—The cranial nerves were apparently intact. Superficial and deep reflexes were equal and normal. No pathological reflexes.

Locomotor system.—No swollen or tender joints. Limbs freely movable.

Integumentary system.—Skin almost coal black in colour. No nævi, ulcers or metastatic nodules were found on careful search.

Laboratory findings.—Urine, an occasional white blood cell, otherwise negative. Blood, red blood cells 4,200,000; white blood cells 7,200; Hgb. 75 per cent. Wassermann test, negative. Electrocardiogram, sinus rhythm; T-wave positive in all leads. Proctoscopic examination showed nothing unusual in the anus, rectum and sigmoid.

X-rays.—The sinuses appeared negative. A film of the maxilla showed absorption of the alveolus about the upper left incisors and bicuspids. The chest film showed a mass about the size of a golf ball in the lower lobe of the right lung.

Biopsy.—Microscopic examination of the specimen showed a growth composed of large melanoblastic tumour cells of immature character, showing numerous mitotic figures. In between the cells were large clusters of pigment. The stroma showed an inflammatory exudate (Fig. 2). Since surgical measures were contra-indicated because of the presence of pulmonary metastasis only palliative treatment was employed.

December 10, 1938.—Seven months after the patient was first seen there was some increase in size of the lesion in the mouth. The cervical glands originally noted on each side were as large as walnuts, and several smaller ones could be palpated in the upper cervical region. The metastasis in the lung was larger, but as yet no other had appeared. The patient complained of dyspnœa, weakness and loss of weight (15 lbs.). It seemed probable that the terminus would not be long delayed.

CONCLUSIONS

The literature concerning the occurrence of malignant melanoma in the coloured races is reviewed. The neoplasm is not so rare as hitherto supposed. Histologically, the disease is the same in coloured and white people. The amount of pigment varies markedly in different parts of the tumour and is no criterion for estimating the degree of malignancy.

Of 224 cases which have been reported in the literature the regional distribution could be analyzed in 170. Of these 65.3 per cent occurred on the foot. The remaining cases were distributed as follows: leg (exclusive of foot) 9.4 per cent; eye 9.4 per cent; upper extremity 7.6 per cent; head 4.7 per cent; trunk 2.4 per cent; mouth and gall bladder, 0.6 per cent each. Since the majority of cases were found in natives of South Africa who frequently injure their feet on sharp objects, trauma is assumed to play an important rôle in their causation. It is interesting that melanotic tumours in the African native often remain locally malignant, less frequently metastasize, and their course is slower if they do, than in the American negro in whom the disease appears to be more malignant.

The fact that negroes frequently develop the neoplasm in areas where there is a change from dark to lighter pigmentation (sole of foot, about the nails of fingers or toes, and the mucous membrane of the mouth) suggests that this may be a predisposing factor, since in many cases there is no history of trauma or presence of a nævus.

A case of malignant melanoma is reported which originated in the mouth of a negro, a very uncommon site. The presence of the pigment in the mouth is explained by the fact that the oral mucosa is derived from the ectoderm. A possible site of origin of the neoplasm may have been one of the pigmented areas which were scattered on the mucosa of the lips, cheeks and gums.

The writer wishes to express his indebtedness to Dr. J. E. Schaefer, of the Cook County Hospital, Chicago, Ill., for permission to publish this case, and to Dr. T. R. Waugh, of the Pathological Department, McGill University, for the interpretation of the microscopic slides.

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OSTEOPSATHYROSIS (FRAGILITAS OSSIUM)

(WITH REPORT OF A CASE)

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OSTEOPSATHYROSIS, fragilitas ossium and osteogenesis imperfecta (congenita and tarda), have not been differentiated in their essential characters and may be considered the same disease.[1]

CASE REPORT

Baby M., aged one day. The weight at birth was 7 lb. 2 oz. Breech presentation. No difficulty in resuscitation. No cyanosis. Fifth baby. Four other healthy children. None with fractures and no history of fractures on either side of family. Mother always healthy. Had adequate pre-natal care.

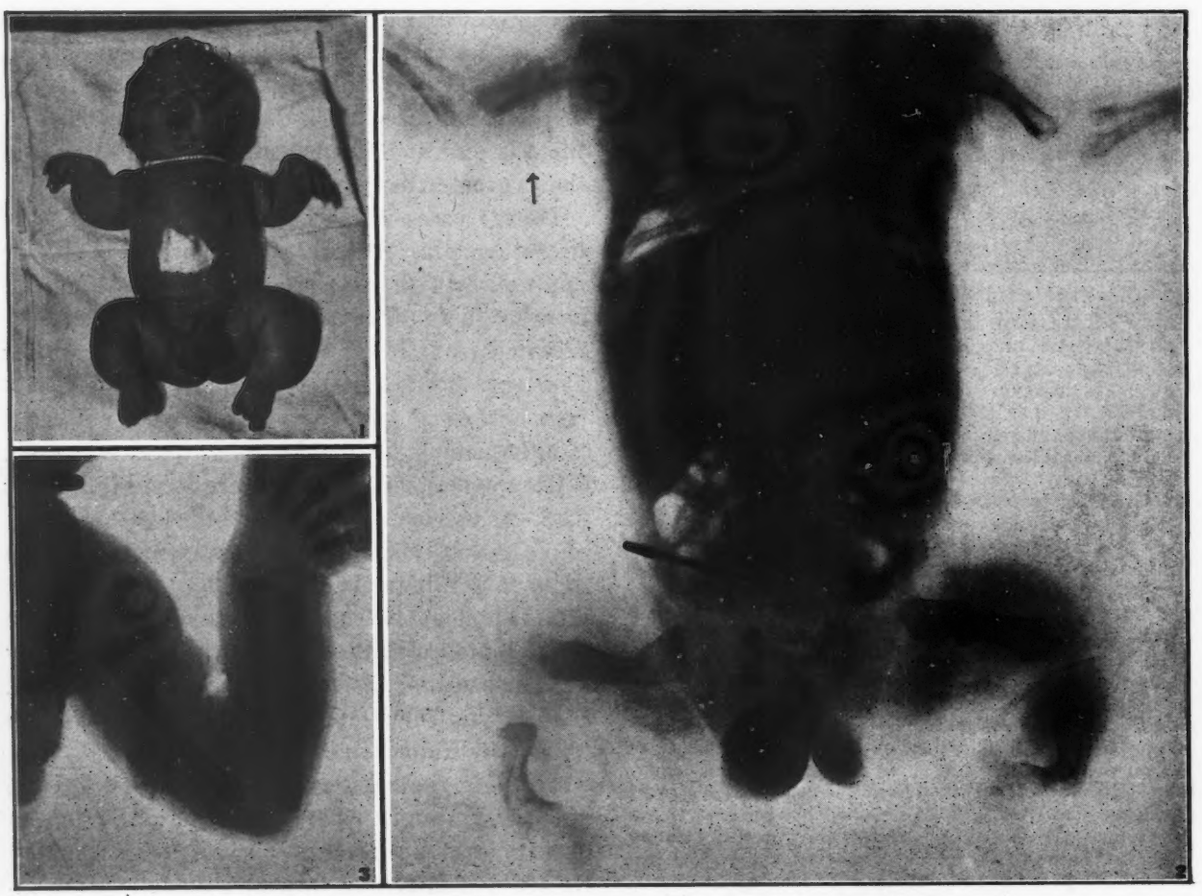

Fig. 1.—Showing the curved extremities and the relatively large head. **Fig. 2.**—Showing the multiple fractures in long bones and ribs. Note arrow pointing to callus formation around fracture, also the lack of density of the bones and the extreme distortion of the bones. **Fig. 3.**—Normal infant, same age and about the same weight. Note how much denser the bone structure is than in osteogenesis imperfecta.

The baby was well nourished, fairly lusty, and active with good colour. The head was large for the size of the body. The chest was small and extremities were extremely deformed by bowing. The following signs were present: sclera of both eyes pale blue; fontanelles and sutures of the head were widely separated. The cranial bones were very thin and cracked like egg shells. There were obvious fractures of the right humerus, right ulna, and right femur. The legs were markedly bowed (Fig. 1).

X-ray report.—Of great interest is the fact that several of the fractures noted below showed callus formation, and as the x-rays were taken within 12 hours of birth the fractures and the resulting callus formation must have occurred *in utero.*

The bones of the skull were very thin; fontanelles not visualized. The blood vessel markings inside the skull appeared to be quite deep. The acromion process of each scapula had a moth-eaten appearance. The left clavicle suggested fracture. Many rib fractures were present—some healed. The right humerus showed a partially healed fracture near its midpoint; the right ulna showed a healed fracture near its midpoint; the left humerus suggested fractures; both femurs, more especially the right, appear distorted, due to fractures.

The prognosis in this case of course was poor. The treatment was general, supplying calcium and phosphorus and Vitamin D. This baby was receiving: dicalcium phosphate, gr. 15, t.i.d. and percomorph oil, minims 6 t.i.d.

Progress.—The baby appeared to do fairly well for the first five days, having lost only five ounces. It took feeding well. An attempt was made to obtain blood from the external jugular vein for chemical tests, but owing to the short neck this was impossible. The baby's head was not used because of the extreme degree of softness.

On the sixth day while taking its afternoon feeding the baby suddenly became cyanosed. No obvious cause was demonstrated, and it was felt that this was due to inhalation of food. The cyanosis lasted for 45 minutes, then gradually disappeared. The baby did not thrive and did not take feedings well. On the tenth day it became cyanosed and died shortly afterwards.

Autopsy. Microscopic findings.—Longitudinal section was made through lower end of the right femur, including the epiphysis and distal end of the shaft. The epiphyseal line was slightly undulating, and the transition from shaft to epiphysis quite abrupt. There was only slight irregularity of the cartilage columns. Many of the cartilage remnants in the distal end of the shaft were around the periphery. The perichondrium of the epiphysis could be traced into the periosteum of the shaft, but here no subperiosteal cortex as such could be seen. Instead of the normal compact bone one saw only isolated bony trabeculæ, very delicate and widely separated toward the epiphysis, but becoming larger and more closely approximated as one proceeded away from the epiphysis. Those trabeculæ close to the epiphysis had a laminated appearance, with only a moderate amount of calcium deposit, and that chiefly around the periphery of the trabeculæ. Farther from the epiphysis this laminated appearance was not seen and the trabeculæ contained more calcium.

Between this very defective cortex on either side of the shaft were a few scattered trabeculæ of bone. In most instances these were very widely separated from one another by the bone marrow. While some of these trabeculæ were a bit elongated with the long axis parallel to that of the shaft, many of them appeared as small, widely separated islands of bone with no apparent relation to the long axis of the shaft.

The bone marrow, which in most instances was quite cellular, filled the intervening spaces and in places extended out to the periosteum. Among the marrow cells could be seen numerous neutrophilic and eosinophilic myelocytes, some polymorphonuclear leukocytes and a few erythroblasts and megakaryocytes.

The section of the distal end of the right femur included also a portion of the fracture. Here, there was a great mass of cellular cartilage, which was being invaded by numerous delicate young bony trabeculæ showing as yet very little evidence of calcium deposit.

The proximal end of the right femur included also a picture like that already described, except that the distance from epiphysis to fracture was shorter, and there was still considerable altered blood clot in the region of the callus. Also in the neighbourhood of the fracture could be seen a number of osteoclasts. Osteoclasts were not seen in any of the sections apart from the fractures.

The above findings would seem to support the view of Weber[5] that osteogenesis imperfecta is a condition of arrested development of bone rather than one of bone dystrophy. The fractures may occur either during extrauterine life or, as in this case, before birth. Just how long before birth these accidents may occur is impossible to say. However, in the fracture studied healing had already proceeded to the stage of new bone formation, although there was still considerable old hæmorrhage. This would suggest that this particular fracture had probably occurred two or three weeks prior to the birth of the child.

Of great interest also was the analysis of the bone ash. The bone ash of the fat-free bone was 27.3 per cent, that of a normal bone being 40.7 per cent. These figures are of extreme interest as they would suggest that there is much more organic tissue and less inorganic element than is normally seen.

Idiopathic osteopsathyrosis is a disease mainly characterized by extraordinary fragility of the bones so that they are likely to be broken by slight trauma. If this condition is present in fetal life the baby may be born dead more likely than living, with multiple fractures, united or not. The disease may not manifest itself so early nor so severely, but in infancy or childhood there may be a series of fractures from slight causes and numbering from a few to many. This brittleness of the bones is apt to be accompanied by other features of varying constancy, *e.g.*, the child is of less than normal size and weight, with delicate skin and silky hair, a relatively large head in the young cases (Fig. 1) but of normal size in the older, small chest and prominent abdomen. Of peculiar interest is the dark blueness of the sclerotics, caused by thinness of the fibrous coating through which the colour of the choroid shows. The cranium is very soft, the long bones are apt to be curved in the diaphysis and to present deformities from previous fractures and calluses if there have been recent ones. The bones most frequently broken are the long bones of the extremities, the femurs especially,

the clavicles and the ribs, but fracture is not confined to these. The fractures unite as promptly as in the normal, but are very liable to re-fracture at the same point. There is usually large callus formation.

The etiology is not definitely known. The history of multiple fractures have been traced in some cases through several generations. There are a number of theories as to causation but all are unconvincing. It is known the absorption of bone is too great in proportion to the deposition of bone, that the trabeculæ, if present at all, are ill-formed from cartilage cells, the osteoblasts apparently failing to function, that the Haversian canals, and lamellæ are badly constructed. Why this faulty growth is not explained.

The diagnosis is at once suggested by multiple fractures or may be suspected in a first fracture from a slight force, especially if there are dark blue sclerotics. Syphilis and rickets should be excluded.

In the Göttingen Women's Clinic,[1] among 45,000 births, only one case of osteogenesis imperfecta was observed. Abt[2] states that heredity plays little part in the congenital form but in the infantile and late forms it is of considerable importance. No changes in the glands of internal secretion have been demonstrated at autopsy on cases of osteogenesis imperfecta. Swanson[3] states that viosterol apparently tends to improve the calcium and phosphorus retention in these cases. Hanson,[4] on the other hand, reports his findings that both parathyroid extract and viosterol tend to increase the output of calcium and phosphorus and produce a negative balance.

I am indebted to Dr. S. MacCallum for permission to report this case and to Dr. Scott for the x-ray report. I wish also to thank Dr. Alan Brown, chief physician at the Hospital for Sick Children, Toronto, for his help in preparing this case report, also Dr. I. H. Erb, Pathologist, at the Hospital for Sick Children, for his post-mortem report, and Dr. Snelling for his many helpful references.

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IODINE DEFICIENCY IN RELATION TO THE STILLBIRTH PROBLEM

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RICHARD LOMER,[1] a Hamburg physician, first called our attention to the therapeutic possibilities of iodine in habitual abortion and premature stillbirth. He reported on the prophylactic value of large doses of potassium iodide and iron administered throughout pregnancy in reducing the incidence of abortion and stillbirth. Although his treatment was primarily designed as anti-luetic, he found that it was effective in patients with a history of habitual abortion or stillbirth whether there was clinical evidence of syphilis or not. Lomer also noted, "The effect of the treatment in all cases was that the general well-being of the patients was much better than in every preceding pregnancy"; and there was also noted an "excellent continuous effect on the children". In the same year, but independently of Lomer, Cholmogorow[2] reported somewhat similar results. However, he thought that mercury and iodides were more important than iodides and iron in this connection.

Franz Lehmann,[3] of Berlin, confirmed the excellent results reported by Lomer following the administration of potassium iodide and iron during pregnancy. In his patients he was able by the Wasserman test to rule out lues as an etiological factor in many cases. He suggested that the efficacy of Lomer's treatment was due to the beneficial effect of iodine upon the function of the thyroid gland and of the iron upon the prevention and cure of secondary anæmia during pregnancy.

In 1924 W. D. Keith,[4] of Vancouver, reviewed the remarkable goitre incidence which previously had been prevalent among the white settlers of the Lilloet Valley situated about 90 miles northeast of Vancouver. Briefly, it appears that prior to 1918 white ranchers in the upper Lilloet Valley were threatened with economic disaster on account of the fact that 85 per cent of their colts and calves and pigs were myxœdematous and died at birth or shortly after. This astonishing occurrence was successfully prevented by administering to the pregnant stock 5 drops of tincture of iodine once a week for two months prior to delivery. On the strength of these findings, Keith recommended to his medical col-

leagues that in all goitrous districts pregnant women should be given 1 minim of tincture of iodine or 1 gr. of sodium iodide daily for 30 days during the 6th and 8th months of gestation, when the termination of the pregnancy occurs in the late winter or early spring months. Keith also suggested that a similar regimen of iodine treatment be given to all women who had a noticeable goitre during pregnancy.

In 1926 Josef Novak,[5] of Vienna, reviewed the pioneer work of Lomer and its subsequent confirmation by Lehmann. He stated "Emphatically this method of therapy proves itself not only as a medium of preventing the death of the fetus but also as a means of mitigating the incidence of pregnancy nephritis". Novak reported four cases, two cases of habitual abortion (5 and 6 abortions respectively), one case of previous death of the fetus *in utero* and one case of "nephritis of pregnancy". In all cases save the fourth living children were obtained following iodine-iron treatment. It is to be noted, however, that Novak used much smaller doses of potassium iodide compared with the heroic one tablespoonful t.i.d. of a 2.5 per cent solution of potassium iodide prescribed by Lomer and Lehmann. Novak's regimen was: of 2.5 per cent potassium iodide solution 20 drops daily for the first week, and then 10 drops throughout pregnancy. Of iron he prescribed 3 Blaud's pills per day.

The tragedy of the occurrence of a stillbirth after an uneventful labour and following a normal pregnancy has ever been present in the writer's mind, particularly when, in the course of fifteen years' experience in obstetrical anæsthesia in Vancouver, he was not infrequently a witness of these unfortunate events. Often the finding of maceration of the skin of the fetus showed that death actually preceded labour. Often too, and indeed too often, it was perfectly obvious that the new life ceased during a labour which was normal or even easier than normal. Accordingly, while dystocia is occasionally given as a cause of stillbirth, it seems probable that when a child dies during or immediately following a labour of only average severity there is something fundamentally wrong with the biochemical or physiological processes of the child.

Formerly it was generally taught, and it is still widely believed, that syphilis is a common cause of stillbirth. The investigations of Pye-Smith[6] have shown that the importance of syphilis in the etiology of stillbirth has been grossly over-estimated. During the experience at Soloman's Antenatal Centre (attached to Guy's Hospital, London) it was found that only 119 women in 9,800 (1.21 per cent) had a positive serological reaction for syphilis, and that in these 119 positive syphilitics a total of 485 pregnancies went to term and the number of stillbirths was only 75! Similarly, in a series of 50 "idiopathic" stillbirths in the Maternity Pavilion of the Vancouver General Hospital, reported in this paper, Kahn and Wassermann tests of 15 unselected mothers failed to show one positive serological test for syphilis.

It is often stated that many stillbirths are due to cerebral hæmorrhage. While this may be a possibility where labour has been severe and prolonged, in the type of stillbirth being considered in this paper, *i.e.*, the so-called "idiopathic" stillbirth, labour was of an easy or normal nature, or, as frequently happened, death took place prior to the onset of labour, as shown by the presence of maceration of the fetus. Moreover, in a series of 36 routine autopsies on babies who were stillborn or who died immediately after birth Warwick[7] reported that while 18 had varying degrees of intracranial hæmorrhage only 2 were stillborn. Further, the finding of gross hæmorrhage in organs other than the brain in 8 out of Warwick's 18 cases of intracranial hæmorrhage would seem to indicate that the hæmorrhage might have been due to some constitutional anomaly—a so-called "hæmorrhagic diathesis", whatever that may be. Again, Roberts[8] has reported a clinical study on a series of 423 newborn negro children. Of these, 60 (14.1 per cent) showed objective signs of intracranial hæmorrhage, *i.e.*, a bloody spinal fluid, but only 26 showed symptoms and only 10 died after delivery as a result of the hæmorrhage. Toxæmia of pregnancy and nephritis as a cause of stillbirth do not concern us in this study, because both of these conditions have been ruled out of this series of unaccounted stillbirths by a consideration of the maternal history.

It was thought that the following study, completed and published[9] some time ago as an interim report, might be of interest and might throw some light on "those cases in which the clinical history, details of labour and autopsy fail to shed any light upon the cause, either in full term or premature fetuses".[10] In this report, only when the attending physician was at a total loss to account for the occurrence of

a full term stillbirth was the case considered as suitable material for this study. For want of a better name the term "idiopathic" has been given to this type of stillbirth.

VITAL STATISTICS REGARDING THE INCIDENCE OF STILLBIRTH

PART I.

In Tables I, II, and III figures are presented which indicate that the stillbirth incidence was 0.36 per cent lower in British Columbia than in Canada as a whole for the five-year period from 1925 to 1929 inclusive, and in Vancouver itself the incidence was 1.67 per cent, being 1.42 per cent lower than in Canada as a whole. More significant however, is the fact that the stillbirth ratio among the Indians of British Columbia is

TABLE I.

STILLBIRTH RATIOS IN CANADA FROM 1925 TO 1929

Year	*Total births*	*Stillbirths*	*Percentage of stillbirths*
1925*....	160,157	5,294	3.3
1926.....	239,855	7,105	3.0
1927.....	241,524	7,336	3.0
1928.....	244,334	7,577	3.1
1929.....	242,981	7,566	3.1
Totals..	1,128,851	34,880	Average percentage 3.09

*Exclusive of Quebec, not admitted to registration area until 1926.

less than half that of the white population, in spite of the fact that in 17 out of 31 instances of stillbirth which occurred no physician was in attendance.

The exponents of the theory of birth-injury as a cause of stillbirth will probably say that this is a case of civilization taking its toll; the uncivilized aborigine bears her young more "naturally" and easily according to this view. However, on discussing this question with Dr. George

TABLE II.

STILLBIRTH RATIOS IN BRITISH COLUMBIA FROM 1925 TO 1929

Year	*Total births*	*Stillbirths*	*Percentage of stillbirths*
1925.....	10,612	270	2.6
1926.....	10,361	298	2.9
1927.....	10,360	276	2.7
1928.....	10,701	316	3.0
1929.....	10,661	283	2.7
Totals..	52,695	1,443	Average percentage 2.73

TABLE III.

STILLBIRTH RATIOS FOR THE INDIAN POPULATION OF BRITISH COLUMBIA FROM 1925 TO 1929

Year	*Total births*	*Stillbirths*	*Percentage of stillbirths*
1925.....	469	5	1.1
1926.....	486	9	1.4
1927.....	505	7	1.4
1928.....	490	8	1.6
1929.....	511	2	0.4
Totals..	2,461	31*	Average percentage 1.26

*The records of the Department of Health show that in 17 of the 31 cases of stillbirth no physician was in attendance.

Darby,[11] resident physician to the Indians at Bella Coola (an Indian settlement near Prince Rupert, B.C.), it was learned that the average duration of labour for an Indian primapara is 12 to 16 hours, the great majority of squaws delivering themselves unaided by medical assistance. Dr. Darby also stated that in a series of 400 deliveries at or near Bella Coola, B.C., in the past 25 years there had been only 7 stillbirths, all of which, with one exception, could be explained, and hence were not in the category which we have termed "idiopathic".

To this relative immunity to idiopathic stillbirth which the British Columbia "coast" Indians enjoy must be added another blessing which is theirs, namely, freedom from goitre of any kind. Dr. Chas. Vrooman and Prof. H. W. Hill, of Vancouver, in 1925 surveyed the Indian settlement at Bella Bella (also near Prince Rupert, B.C.). Among 185 Indians of all ages only one young woman had any enlargement of the thyroid gland, and she had spent most of her life away from the sea coast, having attended school at Sardis, B.C., located about seventy miles inland in the lower Fraser Valley. In July, 1926, these observers, together with Dr. A. S. Lamb, examined 300 additional Indians located at other villages on the coast and found no evidence of goitre.[12] The food of the British Columbia coast Indians is almost entirely salmon, salmon eggs and sea weed, and is accordingly rich in iodine. That Indians as a race are not naturally immune from goitre is shown by the fact that the Alberta Goitre Survey[13] reported an incidence of 9.4 per cent of goitre among Indians. The question that arose in the writer's mind was this: "Is the low stillbirth ratio enjoyed by British Columbia Indians, particularly the coast Indians, due to the same factor which

makes them goitre-free, *i.e.*, an adequate iodine ingestion through an abundant diet of sea food?

From these authentic human experiences the hypothesis was made that insufficient iodine ingestion is a cause of a certain number of stillbirths among the white population of British Columbia, particularly in Vancouver where the writer resided. It must be borne in mind that British Columbia is in the goitre belt; even Vancouver, although situated on the sea coast, has a goitre incidence among school children of 8.04 per cent.[14]

PART II.

It was known to the writer that a certain number of Vancouver physicians, inspired by Dr. Keith's 1924 report showing the great benefit that iodine had wrought for the stock-ranchers of the Lilloet Valley, regularly prescribed this element to their pregnant patients, at least during the last trimester of pregnancy. Accordingly, it seemed reasonable that if one could obtain the relative vital statistics concerning the incidence of stillbirth among the patients of this group of physicians and similarly those of a control group who did not prescribe extra iodine during pregnancy one could form some conclusion as to the protection against the incidence of idiopathic stillbirth which the prophylactic ingestion of iodine afforded white women.

TABLE IV.

LISTED STILLBIRTHS IN VANCOUVER FROM 1925 TO 1929 (INCLUSIVE)

Probable cause of death	*1925*	*1926*	*1927*	*1928*	*1929*	*Total*
Breech delivery	4	6	9	5	3	27
Concealed hæmorrhage	0	0	2	1	2	5
Congenital heart deficiency	0	0	0	3	0	3
Cord around the neck	6	5	7	6	6	30
Cord prolapse	2	8	5	1	4	20
Cord knot	0	0	3	1	0	4
Cord thrombosis	0	1	0	0	0	1
Dystocia (vertex delivery)	7	7	10	13	10	47
Dystocia (version and extraction)	0	1	0	7	2	10
Death of mother	1	0	0	0	0	1
Diabetes of mother	0	1	0	0	0	1
Hydramnios	1	0	1	0	0	2
Hydrocephalus	2	2	2	1	0	7
Intracranial hæmorrhage	1	1	0	0	0	2
Monstrosities	3	3	4	4	1	15
One of twins	2	1	3	4	4	14
Premature separation of placenta	4	2	1	1	2	10
Placenta prævia	0	1	0	1	4	6
Rupture of uterus	0	1	0	0	0	1
Syphilis	0	0	1	1	0	2
Toxæmia of pregnancy	4	3	3	1	6	17
Toxæmia of acute infection	2	0	2	0	0	4
Uncertain Etiology*	3	3	2	0	2	10
"IDIOPATHIC" STILLBIRTHS	23	21	19	16	12	91
Totals	65	67	74	66	58	330

*Under the head of Uncertain Etiology are placed fetal deaths concerning which no probable cause of death was given by the physician, the latter being now either deceased or resident elsewhere, and therefore beyond questioning.

TABLE V.

THE STILLBIRTH INCIDENCE IN VANCOUVER FROM 1925 TO 1929 (INCLUSIVE) IN RELATION TO THE PRENATAL ADMINISTRATION OF IODINE

A. In the practices of physicians prescribing prenatal iodine *routinely*

	Deliveries	*Stillbirths*	*Idiopathic stillbirths*
Specialists (20)	1,112	17 (1.53%)	4
General practitioners (15)	1,144	14 (1.25%)	2
Totals	2,256	31 (1.37%)	6 (0.266%)

B. In the practices of physicians seldom, if ever, prescribing iodine prenatally

	Deliveries	*Stillbirths*	*Idiopathic stillbirths*
Specialists (6)	2,127	37 (1.74%)	12
General practitioners (184)	12,401	240 (1.93%)	66
Totals	14,528	277 (1.90%)	78 (0.537%)

C. In the practices of physician and midwives where uncertainty exists concerning the prenatal use of iodine

	Deliveries	*Stillbirths*	*Idiopathic stillbirths*
Physicians no longer resident (50)	484	9	2
Physicians now deceased (10)	719	13	5
Midwife deliveries	1,743	0*	0
Totals	2,946	22	7
GRAND TOTALS	19,730	330 (1.67%)	91 (0.47%)

*When a stillbirth occurs in the practice of a midwife it is registered in the name of the physician who signs the death certificate.

The second phase of this study therefore deals with the incidence of unexplained or "idiopathic" stillbirths among the female populace of Vancouver, B.C., during the years 1925 to 1929 inclusive (Tables IV and V). First of all, the stillbirth statistics* for this area were minutely scrutinized and classified according to the attending physician's diagnosis of the cause of death. Only when the attending physician was unable to offer any explanation of the cause of death was a case placed in the column labelled "idiopathic". Doubtless, many cases which were at least partly due to these so-called "idio-

* Kindly furnished by the Registrar of Births, Deaths and Marriages for British Columbia, Victoria, B.C.

pathic'' causes (whatever they may be) were thus excluded from this study. It will be noted after perusal of Table IV that in a total of 19,730 deliveries in the five-year period there were 330 stillbirths (1.67 per cent), of which 91 were unexplained or ''idiopathic''.

Then the incidence of ordinary stillbirths and ''idiopathic'' stillbirths was classified (see Table V): (*a*) according as to whether or not the stillbirths occurred in the practices of physicians accustomed to prescribe iodine routinely during the last trimester of gestation (as determined by personal inquiry); and (*b*) according as to whether the idiopathic stillbirths occurred in the practices of physicians skilled in obstetrics and herein referred to as ''specialists''* or whether, on the other hand, they were cared for by men whose practice was more general or whose practice did not include a great deal of maternity work, *i.e.*, general practitioners.

A perusal of Table V reveals that (1) the general incidence of stillbirth is practically identical in the practices of both ''specialists'' and ''general practitioners'', and (2) idiopathic stillbirth appears to be twice as common (0.537 as compared with 0.266 per cent) when prenatal iodine is not prescribed, *i.e.*, as ''B'' is to ''A''.

Although 6 cases of idiopathic stillbirth are ''chalked up'' against the record of the routine prescribers of prenatal iodine, careful inquiry elicited the fact that in four of these cases prenatal iodine ingestion was not followed because the mothers consulted the attending physician only a few days prior to delivery. With this correction, then, it can be stated that there was an incidence of only 2 cases of idiopathic stillbirth in a total of 2,252 deliveries (0.089 per cent) in which iodine was administered to the mothers prenatally.

In contradistinction to this favourably low percentage of idiopathic stillbirths there occurred in the practices of physicians who do not habitually prescribe iodine to pregnant patients 78 idiopathic stillbirths in 14,528 deliveries. If the 4 cases tabulated under ''A'', who received no extra iodine prenatally are included, the total of idiopathic stillbirths in this series is 82 and the percentage of incidence is 0.564 per cent, which is 6 1/3 times as great as in the ''treated'' series ''A'', where iodine was administered during the pregnant state.

* For the purpose of this study a ''specialist'' is a physician who has attended 300 or more deliveries in the 5-year period.

PART III.

The third phase of this study is concerned with an examination of the stillbirth incidence among all patients delivered in the Maternity Pavilion of the Vancouver General Hospital in the three year period from January 1, 1930, to December 31, 1932. In this series there were 4,813 deliveries and a total of 135 stillbirths, of which 50 may properly be classified as idiopathic. In this series, also, cases are classified: (*a*) according as to whether the attending physician is a ''specialist'' or ''general practitioner'', and (*b*) according to whether he routinely prescribes iodine prenatally. The time lapse in this series being comparatively short, it was decided to apply the term ''specialist'' to any physician who had delivered 100 patients or more.

By means of the case record* each case of stillbirth could be accurately and critically reviewed. If there was any doubt about the immediate cause of the stillbirth that case was not included in the column reserved for the idiopathic type. The results are recorded in Tables VI and VII. The blood Wassermann and Kahn tests were both recorded in a total of 15 cases, and in each instance were negative.

TABLE VI.

LISTED STILLBIRTHS IN THE VANCOUVER GENERAL HOSPITAL FROM 1930 TO 1932 (INCLUSIVE)

Probable cause of death	*1930*	*1931*	*1932*	*Total*
Breech delivery	3	5	4	12
Concealed hæmorrhage	1	2	1	4
Cord around the neck	0	1	0	1
Cord prolapse	2	2	0	4
Dystocia (vertex delivery)	1	0	4	5
Dystocia (version and extraction)	2	1	8	11
Monstrosities	4	2	5	11
One of twins	3	1	2	6
Placenta prævia	7	1	3	11
Intracranial hæmorrhage	1	0	5	6
Toxæmia of pregnancy	3	3	5	11
Toxæmia of acute infection	0	1	0	1
Syphilis	1	1	0	2
''IDIOPATHIC'' STILLBIRTHS	20	15	15	50
Totals	48	35	52	135

It will be noted that: (1) in 4,813 deliveries 135 (2.8 per cent) babies were stillborn, and of these, 50 (1.04 per cent) were classified as ''idiopathic''; (2) there were 742 deliveries by physicians accustomed to prescribe iodine prenatally and 17 stillbirths (2.29 per cent), with only one

* Access to the case history of each case of stillbirth was made possible by the courtesy and cooperation of Mr. Fish and his staff in the Department of Records of the Vancouver General Hospital.

TABLE VII.

THE STILLBIRTH INCIDENCE IN THE VANCOUVER GENERAL HOSPITAL FROM 1930 TO 1932 (INCLUSIVE) IN RELATION TO THE PRENATAL ADMINISTRATION OF IODINE

A. In the practices of physicians prescribing prenatal iodine routinely

	Deliveries	*Stillbirths*	*Idiopathic stillbirths*
Specialists (3)....	515	10 (1.14%)	1
General practitioners (14)...	227	7 (3.08%)	0
Totals.....	742	17 (2.29%)	1 (0.134%)

B. In the practices of physicians seldom or never prescribing prenatal iodine

	Deliveries	*Stillbirths*	*Idiopathic stillbirths*
Specialists (3)....	447	21 (4.7%)	7 (1.56%)
General practitioners (158)..	2,442	71 (2.9%)	27 (1.1%)
Hospital "staff" cases.....	1,182	26 (2.2%)	15 (1.29%)
Totals.....	4,071	118 (2.9%)	49 (1.203%)
GRAND TOTALS..	4,813	135 (2.8%)	50 (1.04%)

idiopathic stillbirth (0.134 per cent); (3) in the practices of physicians who seldom or never prescribed iodine prenatally there were 4,071 deliveries, 118 stillbirths (2.9 per cent), and 49 idiopathic stillbirths (1.203 per cent), or 9 times the incidence in the iodine-treated group; (4) it would appear that obstetrical skill plays no part in the incidence of idiopathic stillbirths, because the incidence was slightly greater among "specialists" (1.56 per cent) than among patients delivered by "general practitioners" (1.10 per cent) or in hospital "staff cases" (1.29 per cent), the latter being delivered by interns.

DISCUSSION

Drs. Abbott and Ball,[15] of Winnipeg, have made a study of the thyroid glands of stillborn fetuses and newborn babies who died at birth or soon after birth. In a series of 100 autopsies after deaths of this type they found that 41 per cent had "anatomical evidence of disease in the thyroid gland". They presented this datum as evidence for "the necessity of thyroid medication (iodine) for the mother during pregnancy if the incidence of goitre is to be lowered." This factual evidence might also be construed to demonstrate that stillbirths and early neo-natal deaths are, in 41 per cent of cases at least, probably related to thyroid dysfunction. It is reasonable to infer that the same biochemical factors which, in the absence of sufficient iodine ingestion by the pregnant animal, cause the intra-uterine or early neo-natal death of calves, foals and pigs, might also, under like conditions of relative iodine insufficiency, cause the intra-uterine or neo-natal death of human beings. The present statistical study would suggest that such is the case. The experiences of Lomer, Cholmogorow, Lehmann and J. Novak, all indicate that adequate iodine ingestion in the early months of pregnancy affords protection in a remarkable degree against the incidence of habitual abortion. Further, the experiences of those clinical investigators using large doses of potassium iodide would also suggest that the pregnant woman can absorb relatively large quantities of iodine without any untoward effect.

SUMMARY AND CONCLUSIONS

1. There is a direct relationship between inadequacy of ingestion of iodine during pregnancy and a common form of hitherto unexplained stillbirth herein referred to as "idiopathic" stillbirth.

2. The administration of iodine to women during pregnancy almost entirely prevented this type of stillbirth in Vancouver, over a period of years.

3. Seafood, fresh or canned, should be utilized as a source of maternal iodine. Failing in this supply, two or three minims weekly of a saturated solution of sodium or potassium iodide are suggested, particularly in the last trimester of pregnancy.

4. The work of Lomer and other early investigators would suggest that iodine insufficiency may be the cause of habitual abortion in some instances.

5. The experience of Lomer, Lehmann and others, who used large doses of potassium iodide (144 gr. daily) throughout pregnancy, would suggest that the pregnant woman can tolerate even large doses of this substance without any untoward result.

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LOBAR PNEUMONIA

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THIS paper is a review of the cases of lobar pneumonia admitted to the Montreal General Hospital, including the Western Division and the Private Patients' Pavilion, from July, 1936, to July, 1938, and including where possible the statistics from a previous paper by one of us (L.C.M.) covering the period from July, 1935, to July, 1936.[3] With one exception this report is confined to adolescent and adult patients. For purposes of brevity the following information is compiled in table form. The data have been taken from the filed case reports, and only those cases used in which the diagnosis has been proved by clinical, bacteriological, and pathological findings, and by x-ray.

TABLE I.

ADMISSIONS PER MONTH OF 238 CASES OF LOBAR PNEUMONIA

Months	*1936-1937*	*1937-1938*	*Total*	*Percentage*
January.....	21	25	46	19.32
February.....	21	14	35	14.70
March.....	14	13	27	11.34
April.....	10	14	24	10.08
May.....	6	9	15	6.30
June.....	3	7	10	4.20
July.....	3	3	6	2.52
August.....	4	0	4	1.68
September....	2	5	7	2.94
October.....	8	10	18	7.56
November....	7	9	16	6.72
December....	10	20	30	12.60
Total....	109	129	238	

TABLE II.

DAY OF DISEASE ON ADMISSION OF 238 CASES OF LOBAR PNEUMONIA

Days	*1936-1937*	*1937-1938*	*Total*	*Percentage*
1st day.....	9	11	20	8.40
2nd day.....	24	26	50	21.00
3rd day.....	20	32	52	21.85
4th day.....	21	11	32	13.44
5th day.....	14	18	32	13.44
6th day.....	3	10	13	5.46
7th day.....	2	7	9	3.78
8th day.....	4	3	7	2.94
9th day.....	1	0	1	0.42
10th day.....	1	1	2	0.84
11th day.....	1	2	3	1.26
12th day.....	1	1	2	0.84
13th day+...	1	3	4	1.68
?	7	4	11	4.62
Total....	109	129	238	

The data are presented in the hope that they may be useful for comparison with future reports dealing with specific chemotherapy of lobar pneumonia.

The monthly admissions show the greatest incidence during the winter months. In our series December, January, February, March and April account for 68.04 per cent of all cases.

As shown in Table II the greatest number of admissions to hospital are during the 2nd, 3rd and 4th day, in this series amounting to 56.29 per cent. In considering the whole series 78.13 per cent of cases are admitted in the first 5 days of disease.

TABLE III.

THE SEX-INCIDENCE IN 332 CASES OF LOBAR PNEUMONIA

Year	*Male*	*Female*	*Total*
1935-1936.....	63	31	94
1936-1937.....	81	28	109
1937-1938.....	90	39	129
Total.....	234	98	332

It will be noted that out of 332 cases, 234, or 70.5 per cent, were males, and 98, or 29.5 per cent, females.

TABLE IV.

AGE-INCIDENCE IN 235 CASES OF LOBAR PNEUMONIA

Age in years	*1936-1937*	*1937-1938*	*Total*	*Percentage*
0 to 10.....	0	1	1	0.43
11 to 20.....	16	15	31	13.20
21 to 30.....	11	16	27	11.49
31 to 40.....	23	24	47	20.00
41 to 50.....	20	30	50	21.27
51 to 60.....	14	20	34	14.47
61 to 70.....	17	14	31	13.19
71 to 80.....	7	5	12	5.10
81 to 90.....	1	1	2	0.85
91+	0	0	0	
Total....	109	126	235	

This table shows a maximum incidence between the ages of 31 and 50, comprising 41.27 per cent of our cases.

TABLE V.
AGE-INCIDENCE IN FATAL CASES OF LOBAR PNEUMONIA

Age	*1936-1937*	*1937-1938*	*Total*
1 to 10.....	0	0	0
11 to 20.....	2	1	3
21 to 30.....	2	0	2
31 to 40.....	3	3	6
41 to 50.....	1	10	11
51 to 60.....	1	2	3
61 to 70.....	5	5	10
71 to 80.....	3	2	5
81+	0	1	1
Total...	17	24	41

This shows the maximum death rate in the 41 to 50 year group and a second peak in the 60 to 70 year group, but it must be remembered that the greatest incidence of admissions appeared in the 31 to 50 year age group.

TABLE VI.
WHITE BLOOD CELL COUNT IN 233 CASES OF LOBAR PNEUMONIA

	1936-1937	*1937-1938*	*Total*	*Percentage*
0 to 5,000	3	5	8	3.43
5,000 to 10,000	13	19	32	13.73
10,000 to 15,000	31	27	58	24.89
15,000 to 20,000	26	30	56	24.03
20,000 to 25,000	17	21	38	16.30
25,000 to 30,000	14	11	25	10.73
30,000 to 35,000	3	4	7	3.00
35,000 to 40,000	0	4	4	1.71
40,000 to 45,000	1	1	2	0.85
45,000+	0	3	3	1.28
	108	125	233	

TABLE VII.
WHITE CELL COUNT IN FATAL CASES OF LOBAR PNEUMONIA

	1936-1937	*1937-1938*
0 to 1,000.....	0	0
1,001 to 2,000.....	0	1
2,001 to 3,000.....	1	0
3,001 to 4,000.....	1	0
4,001 to 5,000.....	1	2
5,001 to 6,000.....	0	1
6,001 to 7,000.....	1	1
7,001 to 8,000.....	0	2
8,001 to 9,000.....	0	0
9,001 to 10,000.....	0	2
10,001 to 11,000.....	1	2
11,001 to 12,000.....	2	0
12,001 to 13,000.....	0	0
13,001 to 14,000.....	0	2
14,001 to 15,000.....	0	2
15,001 to 16,000.....	1	1
16,001 to 17,000.....	0	1
17,001 to 18,000.....	2	2
18,001 to 19,000.....	0	0
20,000 to 30,000.....	6	3
40,000 to 50,000.....	1	1
50,000 to 60,000.....	0	1
Total.....	17	24

The leucocyte count in this series shows that about half the cases, 48.92 per cent, have a leucocytosis of between 10,000 to 20,000 cells, yet the count may range anywhere from less than 5,000 cells to over 45,000 cells. In the cases of extremely high leucocyte counts dehydration seems to play a rôle, for in some of our cases following intravenous therapy the leucocyte count was found to drop from 50,000 cells to 15,500 in 12 hours. (Table VI.)

The white cell count in fatal cases ranged from 1 to 2,000 up to 50,000+, with a fairly equal distribution in each 1,000 grouping. Thus, the leucocytosis is not a reliable prognostic index if taken by itself. (Table VII.)

TABLE VIII.
HOSPITALIZATION IN LOBAR PNEUMONIA

	1936-1937	*1937-1938*
Number of cases.....	89	102
Average days in hospital.....	29.7	27.1
Average necessary hospitalization.	20.3	20.1

In the first group, "average days in hospital", these results are based on the total number of days in hospital including those cases with prolonged convalescence following complications and patients awaiting transfer to convalescent homes.

In the "average necessary hospitalization" the results are based on the group above, only allowing 8 days' hospitallzation following a normal temperature in uncomplicated cases and 14 days following a normal temperature in complicated cases.

TABLE IX.
TYPE OF ONSET IN LOBAR PNEUMONIA

	1936-1937	*1937-1938*	*Total*	*Percentage*
Previous respiratory infection...	70	76	146	61.35
No previous respiratory infection	30	48	78	32.77
No onset given...	9	5	14	5.88
Total.....	109	129	238	

In answer to the question of whether pneumonia sets in suddenly or is preceded by an upper respiratory infection our series shows that the majority, 61.35 per cent, of cases give a history of a preceding upper respiratory infection. In 5.88 per cent of cases the type of onset was not given.

TABLE X.

MODE OF TERMINATION IN LOBAR PNEUMONIA

	Crises	*Lyses*	*Deaths*	*Total*
1935-1936	28	59	7	94
1936-1937	40	54	15	109
1937-1938	44	59	23	126
Total	112	172	45	329

It will be noted from this table, which includes all the cases of lobar pneumonia admitted from July, 1935, to July, 1938, that the majority of cases terminated by lysis.

TABLE XI.

SPECIFIC TYPING IN 329 CASES OF LOBAR PNEUMONIA

Types	*1935-1936*	*1936-1937*	*1937-1938*	*Total*
I	14	22	37	73
II	8	8	16	32
III	8	21	12	41
IV	..	..	8	8
V	..	8	6	14
VI	..	..	1	1
VII	10	9	7	26
VIII	5	3	13	21
?	49	37	27	113
Total	94	108	127	329

During the year 1935-1936, Nos. IV, V and VI were not typed.

During the year 1936-1937, Nos. IV and VI were not typed.

During the year 1937-1938, the first eight types were typed. This was done by the Neufeld technique. Those that were negative in the Neufeld were proved of pneumococcal etiology by the mouse method. These are grouped as the unknown type. The final year of 1937-1938 series of typing conforms with that of other series and it shows that about half of all pneumonia cases fall into the first three specific types.

TABLE XII.

MODE OF TERMINATION IN 235 CASES OF LOBAR PNEUMONIA, 1936-1937, 1937-1938

	Serum-treated		*Not serum-treated*	
	Number	*Percentage*	*Number*	*Percentage*
Crises	54	49.54	30	23.80
Lyses	41	37.61	72	57.14
Deaths	14	12.84	24	19.06
Total	109		126	

In comparing the mode of termination of serum-tested cases with non-serum-treated cases, the ratio of crisis to lysis is reversed. In the serum-treated cases the majority terminated by crisis.

TABLE XIII.

RESULTS OF SPECIFIC SERUM TREATMENT COMPARED WITH NON-SPECIFIC TREATMENT IN LOBAR PNEUMONIA

	With serum			*Without serum*		
		Deaths			*Deaths*	
Type	*Cases*	*Number*	*Per-centage*	*Cases*	*Number*	*Per-centage*
I	62	6	9.67	11	3	27.27
II	25	3	12.00	7	0	....
III	2	1	50.00	39	14	35.89
IV	2	0	....	6	1	16.66
V	8	2	25.00	6	0	....
VII	15	2	13.33	11	0	....
VIII	10	1	10.00	11	0	....
	124	15	12.09	91	18	19.8

Type V applies only to 1936-1937 and 1937-1938.
Types IV and VIII, serum used only in 1937-1938.

In this table although the number of deaths (15) in 124 serum-treated cases compared with the number of deaths (18) in 91 non-serum-treated cases shows improvement, this improvement is minimized, because in hospital practice, where serum is available, a patient admitted late in the disease or with a low or falling temperature would not be given serum. This accounts for the low death rates in non-serum-treated cases in Types V, VII and VIII.

TABLE XIV.

SERUM USED IN TREATED CASES OF LOBAR PNEUMONIA

Types	*Cases*	*Minimum*	*Maximum*	*Average*
I	52	40,000	400,000	153,440 units
II	20	40,000	400,000	183,680 "
III	1	120,000		
IV	2	60,000	160,000	110,000 "
V	8	100,000	200,000	165,350 "
VII	12	100,000	380,000	184,560 "
VIII	10	10,000	180,000	125,000 "

This table shows the marked variation in the amount of serum required per case, with the average amounts used, and also the enormous expense of treating such cases. This has been the experience of other workers with special reference to Type I serum.[2]

TABLE XV.

TYPING AND TERMINATION IN 23 CASES OF BACTERIÆMIA OCCURRING IN 188 CASES OF LOBAR PNEUMONIA FROM JULY, 1936, TO JULY, 1938

(188 BLOOD CULTURES IN A SERIES OF 238 CASES)

Type	*Cases*	*Crisis*	*Lysis*	*Deaths*	*Serum*	*No serum*
I...	6	1	3	2	5	1
II...	3	0	2	1	3	0
III...	7	0	0	7	0	0
IV...	1	0	0	1	0	0
V...	2	0	1	1	1	1
VIII...	1	0	1	0	1	0
? ...	2	0	1	1*		
	1†					

*1 case given sulphanilamide.
†Mucosus capsulatus (Friedländer's B.) died.
Total number of cases, 23; deaths, 14 or 61 per cent.
In 4 of these cases serum was used—
(1) Type I..... 260,000 units
(2) Type I..... 260,000 "
(3) Type II..... 240,000 "
(4) Type VIII..... 120,000 "

In this series of 238 cases blood cultures were taken in 188 cases and in these 23 were positive. The number of positive cases (12.2 per cent) is much smaller than that shown by other workers. The mortality rate in this series was 14 cases, or 61 per cent. All these cases had serious complications, such as empyema, lung abscesses, advanced cardio-renal disease, etc.

TABLE XVI.

TYPING AND TERMINATION IN 15 CASES SHOWING BACTERIÆMIA IN 129 CASES OF LOBAR PNEUMONIA FROM JULY, 1937, TO JULY, 1938

Type	*Cases*	*Crisis*	*Lysis*	*Deaths*	*Serum*	*No serum*
I...	4	1	2	1	3	1
II...	3	0	2	1	3	0
III...	3	0	0	3	0	0
V...	2	0	1	1	1	1
VIII...	1	0	1	0	1	0
? ...	2	0	1	1*		

*1 case given sulphanilamide.
Total number of cases, 15; total number of deaths, 7.
In 3 of these cases serum was used—
(1) Type I..... 260,000 units
(2) Type II..... 240,000 "
(3) Type VIII..... 120,000 "

TABLE XVII.

INCIDENCE OF CASES HAVING AS THE ETIOLOGICAL AGENT TWO TYPES OF PNEUMOCOCCI IN A SERIES OF 238 CASES OF LOBAR PNEUMONIA

A TOTAL OF 8 CASES, OR 3.3 PER CENT, WITH NO DEATHS. IN 6 OF THESE CASES TYPE III PNEUMOCOCCI WAS PRESENT.

1936-1937

Types	*Termination*		*Serum*
III and VII	Lysis	Cured	210,000 units
III and VIII	"	"	No
III and VIII	"	"	No

TABLE XVII.—*Continued*

1937-1938

I and VII	Lysis	Cured	80,000 units
III and VIII	"	"	100,000 "
III and VIII	Crisis	"	100,000 "
III and VIII	"	"	140,000 "
VII and VIII	"	"	100,000 "

In this series it is interesting to note that 8 cases showed a positive typing for two different specific types of pneumococci, also the frequency with which Type III appears in the double typing.

TABLE XVIII.

TYPING IN FATAL CASES OF LOBAR PNEUMONIA

	1935-1936		*1936-1937*		*1937-1938*		*Total*	
Type	*No. of cases*	*Deaths*	*No. of cases*	*Deaths*	*No. of cases*	*Deaths*	*No. of cases*	*Deaths*
I	14	3	22	1	37	5	73	9
II	8	0	8	0	16	4	32	4
III	8	3	21	6	13	6	42	15
IV	..	..	..	..	8	1	8	1
V	..	..	8	1	6	1	14	2
VI	..	..	..	..	1	0	1	0
VII	10	0	9	1	7	1	26	2
VIII	5	0	3	0	13	1	21	1
?	49	1	37	6	25	5	111	12
Total	94	7	108	15	126	24	328	46

This table shows the deaths in the specific types for the three separate years. In the year 1935-1936 Types IV, V and VI were not typed

TABLE XIX.

POLYSACCHARIDE TEST IN LOBAR PNEUMONIA

FROM JULY, 1936, TO JULY, 1937

Type	*Number of cases*	*Before serum*			*After serum*		
		Positive	*Negative*	?	*Positive*	*Negative*	?
I	12	2	10	0	9	2	1
II	4	0	3	1	2	1	1
FROM JULY, 1937, TO JULY, 1938							
I	25	6	12	7	16	4	5
II	10	3	6	1	6	2	2

Mode of termination in 1936-1937 group
15 Recoveries
1 Death (polysaccharide test negative throughout course).
Mode of termination in 1937-1938 group
30 Recoveries (14 crisis, 16 lysis) (4 were bacteriæmias)
5 Deaths (1 proved bacteriæmia).
(1) Type I negative throughout, developed meningitis.
(2) Type I negative throughout, complication—lymphosarcoma.
(3) Type II negative throughout.
(4) Type II positive after serum; died of cardio-vascular collapse.
(5) Type II positive after serum; died of lung abscesses with empyema.

because sera were not available; similarly in 1936-1937 for Types IV and VI. Note that in 1937-1938 all seven types were done. This gives a more accurate idea of the expectancy in any series, and also suggests that the unknown groups have progressively diminished.

Types I, II, III, VII and VIII have been typed throughout the series and show what might be termed the expected mortality rate in hospital cases for each specific type.

The polysaccharide test was not carried out on all cases admitted because the material was not available or because the pneumonia was subsiding on admission. (Table XIX.)

In the first group (1936-1937) before serum, 13 showed a negative reaction; after serum, 3 showed a negative reaction, and of these 1 died, having shown a negative reaction, throughout the course of disease..

In the second group (1937-1938), before serum, 18 showed a negative reaction; after serum, 6 showed a negative reaction, and of these 5 died. In all but one case the patient's death was caused by some serious complication.

In this group there were 5 cases of bacteriæmia, 4 terminated by lysis and recovery, and 1 death, a Type II, in which the pneumonia was really secondary as a complication in lymphosarcoma of the pharynx.

CONCLUSIONS

A statistical study of the cases of lobar pneumonia admitted to the Montreal General Hospital for the years 1935-1938 has been presented.

It is realized that the series is a small one, especially as regards the serum treatment cases. It does, however, demonstrate the increasing use made of typing in each succeeding year.

There is also the interesting finding that the leucocyte count *per se* was of no definite prognostic value.

The admissions per month, the day of disease on admission, and the sex-incidence are in line with the reports of other workers.[1]

A careful history will reveal a previous respiratory tract infection in the great majority of cases.

Lobar pneumonia does not, as a rule, attack a perfectly healthy person.

Types I, II and III pneumonia accounted for over 50 per cent of the cases of pneumonia which were specifically typed.

The benefit of serum treatment in all types, grouped as a whole, is evident, though not very striking in this small series.

The increased gravity of prognosis in bacteriæmia is emphasized.

A positive polysaccharide test did seem to indicate a favourable prognosis.

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THE DIAGNOSIS AND TREATMENT OF NEUROTIC DISORDERS*

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A LARGE part of the practice of every physician is comprised of those whose complaints are organic in nature, but who present no organic lesions. The medical man attaches the term "neurotic" to these people, and he approaches their treatment with a distaste and uncertainty which are all too frequently reflected in the results. The fact that these conditions arise in a logical fashion from underlying emotional maladjustments frequently goes unrecognized, to the detriment of both the patient and the physician.

The nature of the symptoms emanating from an emotional discord varies a great deal. The patient may simply complain of the fatigue and loss of appetite which accompanies any state of anxiety. Or the anxiety may be severe enough to cause physiological manifestations of a stimulated sympathetic nervous system, such as, tachycardia, excessive perspiration, flushing, intestinal stasis, and deep apprehension. Or, finally, the state of anxiety may serve to lower the pain threshold, and permit normal physiological sensations to attain undeserved terrifying

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proportions. Of all emotional disturbances the anxiety state and its concomitant multitude of symptoms is the commonest, the easiest to treat, and the most frequently improperly treated. Much less frequently seen, and generally easier to recognize, are the hysterical manifestations evidenced in paralyses, anæsthesias, seizures, etc. In these reactions the patient has attempted to resolve his anxiety state in a condition less difficult to bear. For example, a patient in the throes of anxiety because on the eve of his marriage he lost his position developed an hysterical paralysis. This illness justified his unemployment, his self-respect was saved, and his conflict subsided. The anxiety state returned, of course, when the paralysis was relieved by psychotherapeutic suggestion.

A third, and still less frequent sign of emotional conflict, sometimes brought to the attention of the general practitioner, is the compulsive-obsessive reaction. In this manifestation the patient has a distressing idea or compulsion constantly intruding itself on his mental or physical horizon. It may be an unwarranted fear of death or cancer, or it may be an overwhelming desire to repeatedly perform some simple manœuvre. In these cases the expressed idea is in reality only a symbol of an underlying current of anxiety. Accordingly, to the practising physician come patients suffering from various emotional disturbances. These are evidenced in all manner of symptoms, ranging from subtle mimicry of organic disorder to states of deepest emotional stress.

The object of this paper is to report our own experience in treating a group of 50 persons suffering from neurotic complaints—complaints similar to those heard every day by the physician in practice. From this report we shall endeavour to point out the simplicity of the technique required for both diagnosis and treatment, and to indicate the practicability of its application by the practising physician. From February to December, 1938, an intensive study was made of this problem of psychoneurosis in the Out-Patient Department of the Toronto Psychiatric Hospital. The material included some 50 cases diagnosed neuroses. The bulk of this group was made up of patients who had haunted for varying periods of time not only general hospital wards and clinics but also the offices of the general practitioners. These people had been referred to the Psychiatric Hospital when the psychogenic nature of their complaints was recognized, and it was seen that these complaints were not responding to the assurance that no organic disorder existed. In the course of our study of this problem, we recognized that, as psychiatrists, it behooved us to try to see it from the point of view of the practitioner. In order to effect this we interviewed literally dozens of practising physicians that we might obtain their experiences and reactions. We also perused the significant medical literature in an effort to acquire a reliable picture of the extent and implications of the problem.

From this preliminary investigation we obtained an approximate idea of the frequency with which complaints, wholly psychogenic in origin, were presented to the medical practitioner. The consensus seemed to support the figure given by J. R. Rees, that between 35 and 50 per cent of all complaints brought to the physician's office were without pathological background. And, to indicate the economic implications of these psychogenic illnesses, we have the interesting report of Halliday, who investigated 1,000 consecutive cases where illness resulted in time lost to persons insured under the British health insurance plan. He found that about 330 of the group of 1,000 were invalided because of psychoneurotic complaints. To round out the picture of the importance of the neuroses in the practice of medicine, Halliday referred to a report of Hardy which suggests that 20 to 30 per cent of all abdominal surgical operations have been performed in a vain effort to cure complaints which in reality were without pathological basis. Of our own group of 50 cases practically all had gone at different times to not one but several physicians.

The physicians with whom we discussed the situation generally expressed not only interest but likewise bewilderment concerning the problem of the neuroses. This bewilderment included some uncertainty as to accurate diagnostic criteria in neuroses and a considerable lack of confidence in their ability to pursue adequate treatment. In addition to this, many deplored as wasted the time spent on these people. The uncertainty of the average physician when confronted by a neurotic was confirmed by the inconsistencies of treatment, as reported to us by our group of patients. Now, to understand this fully, and to trace the career of the psychoneurotic, let us look at the medical man as he meets his patients. First let us say, in accordance with the suggestion of Rees, that 50 to 65

per cent of all his patients are suffering from organic disorders. These are diagnosed and adequately treated. This leaves the large residue whose illness springs from a psychogenic basis. Now, not all of this group will require psychiatric study in order to alleviate the symptoms. In probably less than one-fifth will this be necessary, for physical symptoms with a psychological and physiological basis occur in everyone, and no one is free from transient conditions such as, tachycardias, gastrointestinal disorders, headaches, etc., which are concomitant with emotional distress.

When no significant organic explanation is found to account for symptoms the physician simply gives ample reassurance that all is well, with possibly an accompanying placebo. Four out of five of these patients so reassured will accept the reassurance. In short order their complaints will disappear. The remaining one of the five, however, is not so easily convinced. He either returns with similar or new complaints or else goes to another physician. This may cause the physician lacking psychiatric insight to doubt the correctness of his negative diagnosis and he may incorrectly interpret the symptoms as part of an organic syndrome. He may even, in his state of indecision, institute the treatment that such an organic condition would require. Consequently our patients, seen at the Psychiatric Hospital, reported such surgical treatment as appendectomy, ovariectomy, hysterectomy, submucous resection, thyroidectomy. All this with no relief of symptoms. Similarly we had examples of medical treatment directed at migraine, peptic ulcer, hyperthyroidism, colitis, etc., with similar results. While treatment based on an organic conception for what is in reality a psychological disorder may do no physical harm to the patient, yet it confirms him in the belief in the organic nature of his complaints. This renders more difficult the ultimate application of psychotherapeutic principles to the problem.

Let us emphasize here, that these facts are not presented in the form of criticism. We recall too many instances of our own fallibility for that. Rather they are indicated to emphasize to the physician how essential a part of his armamentarium is some psychiatric knowledge and experience. Subsequently in this paper we shall endeavour to demonstrate how the physician in practice may obtain both his knowledge and experience.

Definitely these patients of whom we speak do not respond to the simple assurance that all is well; nor do they respond adequately to medical and surgical treatment directed at a non-existent condition. They go first from physician to physician, and later to the naturopath, the chiropractor, or the osteopath. These latter gentlemen do not long leave their patients suffering the anxiety of undiagnosed symptoms. Not only is a diagnosis promptly given but also a degree of impressive attention which delights the heart of the psychoneurotic. At last someone has been found who admits the existence of an illness. The outcome of this attention is some alleviation of symptoms, even though the explanation postulated seems to the medically trained ridiculously in error. So it ill behooves the medical man to condemn too strongly the osteopath until his own house is completely in order—for it is only when the physician fails to recognize the urgent need for help that the neurotics turn to the drugless practitioner.

DIAGNOSIS

When a patient came to clinic presenting complaints suggestive of neuroses, we first undertook to rule out two conditions. First, and of course most important, was organic disease and the second, psychotic manifestation. With regard to the former it was essential to bear in mind that the symptoms of a psychoneurosis, although psychogenic in origin, are physiological in manifestation. For example, a man 25 years of age suffering from an anxiety state showed evidence of sympathetic stimulation. He had dilated pupils, excessive perspiration and tachycardia. Physical examination revealed no organic basis for these manifestations, but personality study showed an underlying agitated emotional state resulting from feelings of inferiority and financial insecurity. Those emotional factors through the autonomic nervous system had brought about the symptoms. Hence diagnosis becomes a matter of determining whether psychogenic or organic factors cause the production of the physiological manifestations. Differential diagnoses followed two paths. (1) To rule out organic disorder by physical examination and exclusion. (2) To find in the individual's history those evidences of emotional instability which are common to psychoneurotics.

With respect to ruling out organic disorder different symptoms presented different degrees of difficulty. Hysterical paralyses and anæs-

thesias were identified easily by neurological examination. Hyperthyroidism was ruled out by basal metabolic tests. Exercise tolerance proved a fairly reliable criterion in cardiac conditions. Gastrointestinal complaints presented somewhat more difficulty. For example, one man reported periodic bouts of gastric discomfort with eructations of gas. It took a longer period than we care to state before we discovered that this was due to a habit of swallowing air when emotionally distressed. When the use of every reasonable diagnostic procedure had failed to disclose evidence of an organic lesion we next turned to the patient's descriptions of his illness. Here generally was disclosed a fact that is almost pathognomonic of neurosis, to wit, multiplicity of complaints. Not always but usually these numbered in the neighbourhood of 8 to 10. They seldom showed a logical pathological relationship. What relationship existed between these complaints was that which would be compatible with the anatomical concepts of the layman but not with those of a physician. To illustrate, one man had a unilateral anæsthesia head to foot. He also had hysterical paralysis of the same side and complained of pain on that side of his head. All these symptoms cleared up in a few days under treatment. Not only are the complaints numerous and varied but also the patient relates them with an emotional intensity not observed in a non-neurotic person with a truly organic disability. The abject fear of the neurotic describing his tachycardia is much more spectacular than the quiet concern of the stable person who suffers from actual myocardial failure.

In addition to organic conditions we must rule out psychotic states. The relationship between psychoneuroses and psychoses is still a matter of conjecture and debate. We shall not here consider the controversial points as to whether psychoneurotic symptoms increase in intensity until the grossly abnormal reasoning of the psychotic appears. We do wish to point out, however, that the phobias, hypochondriacal ideas, and inability to meet life of early schizophrenia present a picture that is often mistakenly diagnosed psychoneurosis. So similar may the two conditions be that this is an understandable, frequently unavoidable error. However, in making our differential diagnosis we found it most valuable to keep in mind that frequently-reported conception, that the psychotic lives in a world of phantasy, unaffected, so to speak, by those vicissitudes of reality which precipitate and exaggerate the symptoms of the neurotic. To the neurotic his environment is hard and real. Unlike the psychotic he can never maintain what has been called "La belle indifference" in unpropitious circumstances.

GENESIS OF NEUROSES

To understand the treatment of neurotics it is necessary to understand some of the basic principles in the genesis of a neurosis. In all psychoneurotic reactions, just as in psychogenic illnesses of the average person, there exists a precipitating factor in the form of a mental conflict. But in addition to this precipitating factor, unlike the case of the average person, there is also a basic personality factor which develops from hereditary or early environmental influences, and which is brought into play by the precipitating situation. This personality maldevelopment not only increases the severity of the psychogenic symptoms but prevents their early resolution.

The precipitating factors were usually easy to determine. In our group we found economic insecurity to rank first in frequency and importance, closely followed in these respects by some maladjustment in the sex life. But in every instance the history revealed a basic personality deficiency. It was in ferreting out these deficiencies and attempting to correct or alleviate them by insight and re-education that much of the success of our treatment depended.

TREATMENT

The essence of the principle of treatment was to gain a sympathetic understanding of the patient. This understanding enabled us to help the patient to recognize and correct the precipitating factor. If this problem was such an insurmountable one as financial distress we directed our efforts at creating a philosophical attitude towards it. The very fact that the patient had found someone able to have a sympathetic appreciation of his present difficulties was in itself a therapeutic aid.

But despite the seeming importance of the present situation it was necessary to remember that it was only an episodic expression of a lifelong abnormal attitude towards reality. Accordingly we endeavoured to decipher the causal factors making up this attitude from the background of the individual, in order to facilitate emotional reconditioning and the formation of mental habits along healthier directions. This

was not analysis along Freudian lines, as we did not anticipate or experience the result of a sudden cure when some emotionally charged, forgotten childhood incident was brought to light. The only dramatically sudden relief of symptoms met with was in cases of hysteria, where symptoms vanished on suggestion, and in a few anxiety conditions, where an explanation of the precipitating factors caused the distress to disappear. We did not find that long established personality traits could be changed by one dramatic disclosure of an isolated incident.

The routine followed, though adapted to suit each individual, was fairly consistent. In the first place a recital of complaints was heard. This served to establish our diagnosis, which was later confirmed by negative physical examination. Then a history was taken with a dual purpose in mind. Firstly, to understand the present situation of the patient in terms of his frictions, worries, environmental stresses, etc., and, secondly, to give us a complete understanding of his familial and childhood background. For it was in this childhood background that we found the factors which prevented the development of emotional adulthood. It was these factors which served to condition the personality to its present inadequate state.

We carefully examined the family history. Here we found it impossible to separate the factors for instability which were passed on in a truly hereditary manner, and those which the patient had acquired from his antecedents by his associations with them. That heredity was an element in the production of neurosis we were convinced, but its importance did not overshadow the importance of environment. For the environment produces the stimulus which directs the formation of the habits and attitudes of the individual; and it is from the individual's attitude towards life and his habits of evading a rational solution of his conflicts that a neurotic personality arises. To a large extent these attitudes and habits result from the child's early contacts with his parents. In over 75 per cent of our cases there was direct evidence of such a faulty parent-child relationship serving as a motivating factor in the moulding of personality. For example, the patient who solved his immediate difficulties by developing a paralysis was the offspring of an over-solicitous mother and an unsympathetic father. The unsympathetic attitude of his father had made him more and more dependent on the protection afforded by his mother. He had early learned that illness was an excellent justification for complete dependence on this protection. Hence, whenever his environmental difficulties became excessive he subconsciously took refuge in illness.

Having obtained some insight into the patient's personality development in the light of his relationship with his parents, this information was carefully noted. No explanations were offered at this point to the patient, as it was considered imperative that the whole picture should be completed before being put to therapeutic use. Frequently, however, the patient would, in the course of describing his relationships with his parents, indicate his adverse emotional reactions during childhood, and, having done so, suggest that these had some bearing on his present condition. This was encouraged because the ultimate aim of the treatment was to develop in the subject sufficient self-reliance, based on insight, that he might be able to reason out for himself the explanation of any subsequent psychoneurotic symptoms. Accordingly, we questioned the patient about his various life epochs, his adjustment at school, not only to his studies but also to his fellows; his social adjustment subsequent to school, his attitudes to life, his habits of conduct.

By the time the history was finished several things had been accomplished. The patient had experienced the relief from emotional tension which comes from being given a sympathetic uncritical ear, by someone who was not shocked by the revelations of the soul which heretofore had held such an uncomfortable importance. The patient, because of careful review, had at last seen his life in a true perspective. Finally, he was acquiring some of the insight necessary for a full appreciation of an explanation of his symptoms.

The history having been completed, the physical examination, unless previously done, was then performed. This was important from both diagnostic and therapeutic aspects. We wanted to assure both ourselves and the subject of the true state of affairs with respect to his physical condition. If any organic condition was found this was explained to him in its true proportion, while if nothing was discovered to account for his symptoms, a statement was made to this effect. Care, then, was taken to leave no doubt in his mind concerning our own confidence in the absence of organic conditions. Particularly did we refrain from such explanations as

"debility", "heart disease", "irritable stomach", etc. Once performed, the physical examination was not repeated. It was felt that this would only serve to leave a lurking suspicion in the patient's mind that we still suspected an organic possibility, and such a suspicion would definitely defeat the whole purpose of the treatment.

Now at last the data were complete and we were prepared to give to the patient our explanation of his symptoms. We started first by tactfully reassuring him that we were fully aware of the subjective reality of his complaints. We pointed out the absence of organic disease as indicated by physical examination. We informed him that his symptoms arose from his emotional difficulties. We illustrated the influence of mind over body by such simple examples as the gastric distress resulting from eating a meal while emotionally disturbed or, by the headache that follows on a bout of worry. We then showed him the factors in his present situation which led to his present attack. If during the history he had already indicated this relationship, his own words were used as far as possible. One woman had said "I'd be all right if my mother only wouldn't interfere". After taking her history and interviewing her mother we heartily subscribed to this opinion. We offered concrete suggestions for alleviation of present conditions. Several patients were temporarily removed from adversely stimulating home situations.

We then turned to the past history of the individual. We showed him the habitual behaviour patterns that led him into the bog of confusion and conflict. We explained the genesis of these habits and attitudes in terms of childhood situations, and offered suggestions for a program of new habit-formation. For example, a young woman was suffering from severe anxiety symptoms arising out of unemployment. Her history revealed a lifelong story of occupational failures. These failures were related to a conviction of personality and intellectual inferiority which she held, despite having successfully graduated from a university in western Canada. They had coincided with periods of emotional tension, tachycardia, inability to think, etc., which invariably arose when her duties produced even mildly critical situations. As she paraphrased it, "I always fail in a pinch". We discovered two factors in her childhood which had served in the conditioning of this type of reaction. She was extremely sensitive about a deformity resulting from a birth injury, and her childhood had been rendered additionally unhappy by an unsympathetic and exacting stepmother.

We pointed out to her how lack of confidence and emotional control had developed from these situations. We helped her construct a philosophical attitude towards life which would neutralize some of her gross feelings of inferiority. Then we laid down a routine which would enable her to form the habit of controlling her emotional reactions when in difficult circumstances. She was very cooperative and her condition improved apace. She now has completed her eighth month in a position which she obtained through her own efforts, and which pays her twice as much as did a position she was unable to hold a year ago because of her emotional difficulties.

We observed with amazement the readiness with which the patients accepted a psychogenic formulation for what they had previously considered to be an organic complaint. Only one patient in the group of 50 absolutely refused to credit the fact that her trouble had an emotional basis. True, in a number of cases, sufficient insight could be developed to bring about alleviation of symptoms. Old habits of thinking were too well established and a reversion to their former organic explanation took place. Also, in a few chronic cases, one felt that acceptance was by word alone and did not depict an underlying deep conviction. By and large, however, the evidence of negative physical examination, plus logical explanation of the symptoms, was adequately and sincerely accepted.

The measure of the acceptance of the explanation was reflected in the follow-up. Only three patients failed to continue to attend clinic until assured that further attendance was not indicated. On their first return the patients almost invariably presented the same or new complaints. These complaints were explained by the same formulation as originally advanced. We endeavoured not to be discouraged if early improvement was not in evidence. Habits and attitudes of a lifetime are not overcome in a few days.

RESULTS

As follow-up work continued patients rapidly fell into three groups: (1) those who improved rapidly; (2) those who improved slowly; and (3) those who did not improve.

In the first group the precipitating factor greatly outweighed in importance the basic personality maladjustment, but in the second and third groups the personality difficulty was the more important. The results were always best if the onset had been sudden.

The final results as presented for this series were tabulated as of December 1, 1938. In collecting the data for this tabulation all those who had attended the clinic since February, 1938, were asked to return in order that their progress might be checked. The results were classified as (1) well; (2) improved; and (3) unimproved. Those classed under the heading "well" showed relief from their symptoms, insight into past difficulties, and an ability to face their problems with equanimity. The improved group all showed insight into their difficulty, but still presented some evidence of their initial symptoms. For example, one man classed in this group would get complete relief from anxiety after each interview. He had become relatively well adjusted, both socially and economically, yet he had not developed sufficient self-reliance to solve all his problems by himself, but felt the need to return about once monthly for further therapeutic conversation. The unimproved group generally showed varying degrees of insight, but little or no lessening of symptoms. They seemed to experience some comfort from, and were desirous of, continuing the interviews, but generally one entertains little hope for their eventual recovery.

Using the above classification as a guide, the results are tabulated below. To simplify interpretation of these results the patients were listed in either of two groups, depending on the time when they were first seen in clinic. The first group was admitted to clinic and received the major portion of treatment between February and June, 1938. It comprised 15 patients. The results of this group, as ascertained on a check-up July 1, 1938, were as follows:

TABLE I.
GROUP I. JULY 1, 1938.

Well	5	33 per cent
Improved	6	39 " "
Unimproved	4	27 " "

Subsequently to this check-up in July a number of these patients were not again seen until their condition was again checked in December, 1938. Most of them, however, were seen at very irregular intervals. The results of a survey of the same group five months later were as follows:

TABLE II.
GROUP I. DECEMBER 1, 1938.

Well	9	57 per cent
Improved	4	27 " "
Unimproved	2	13 " "

A comparison of Tables I and II shows a trend of improvement of this group of 15 patients five months after intensive treatment had practically been complete. This illustrates the dynamic properties of psychotherapy, inasmuch as once the patient has acquired insight, improvement frequently continues even without further assistance. The realization of this fact by the physician helps to counteract the feeling of discouragement he often feels when progress seems slow at the beginning of treatment. It is interesting to note that of those members of this group who were unemployed at the time of their admission to clinic, 60 per cent, by December 1, 1938, had acquired and were holding gainful occupations.

Group II comprised 35 patients admitted to and treated in the clinic between September 1, 1938, and November 15, 1938. The results are tabulated as of December 1, 1938.

TABLE III.
GROUP II. DECEMBER 1, 1938.

Well	7	20 per cent
Improved	16	46 " "
Unimproved	9	26 " "
Lost sight of	3	8 " "

These results are comparable with those obtained in Group I in the survey of July 1, 1938. The time after onset of treatment was also similar in this group. In the light of our experience with the effect of the time element on the results in Group I it would seem reasonable to anticipate a similar improvement in Group II when an additional 5 or 6 months will have elapsed.

Table IV shows a complete tabulation of the results of the whole 50 cases as ascertained on December 1, 1938.

TABLE IV.

Well	16	32 per cent
Improved	20	40 " "
Unimproved	11	22 " "
Lost sight of	3	6 " "

In assessing Table IV it is necessary to bear in mind that Group I and Group II have been totalled together, although the survey was made before the treatment of Group II could be said to have been completed.

In drawing conclusions from our results the bulk of deduction must be made on Group I, which is small for statistical purposes. However, it would seem reasonable to conclude (and so far results on Group II have supported this conclusion), as follows: of psychoneurotics, adequately treated, one may expect to find free from symptoms 20 to 30 per cent at four months and 50 to 60 per cent at eight months after the onset of treatment. In addition to this, a large number, although not free of symptoms, will be living happier and better adjusted lives.

NEUROSIS, A MEDICAL PROBLEM

We respectfully submit our report to the attention of the medical practitioner. That satisfying results can be obtained without elaborate ritualistic technique and excessive expenditure of time is evident. Whether such psychological treatment of neurotic persons is feasible in general practice the physician himself must decide. However, the medical man cannot afford to be oblivious to the question of psychoneurosis. For, even though he feels he has neither the time nor the patience to expend, the problem, like bad debts, is with him always. Certainly, to be true to himself and to his profession, he must perfect his diagnostic ability to the extent that he can definitely recognize a functional condition in order that he may not institute medical or surgical treatment where it is so strongly contra-indicated. If he himself is not prepared to spend the time required he should be prepared to send the patient to an adequate source of treatment. Otherwise, this unfortunate person will eventually drift from his guidance into the clutches of the charlatan.

In times past physicians experienced in handling this type of disorder were few and far between. Fortunately, at the present time this state no longer holds to the same extent. The Provincial Department of Health has mental health clinics established throughout the province, headed by trained psychiatrists and providing a consultant service for practising physicians. Further, the present generation of medical students is graduating with an increasing awareness of these problems. But the practitioner should ponder twice before relegating from his practice the care of the emotionally ill. The technique of diagnosis and treatment of psychoneurosis can easily be acquired by a limited amount of reading, if this is followed by putting into practice, in a half a dozen cases, the principles learned. The individuals treated make a most appreciative group. The expression of their gratitude alone repays the physician for the discouragement and occasional annoyance which he will probably suffer at their hands. Nor are all the benefits accruing from the time spent studying psychoneurotics directly related to the work performed. The physician gains new insight into the personality and problems of human beings in general, which serves him well in any branch of medicine. He automatically develops a kindly, sympathetic understanding approach to people which his manner indubitably reflects.

In conclusion, we have endeavoured to indicate the importance of this problem from the standpoint of the medical practitioner. We have tried to show that adequate handling of the psychoneurotic falls within his scope, and that the rewards, both material and in personal satisfaction, will be commensurate with the effort expended.

Oxygen tanks and gas masks are coming to the rescue of migraine headache sufferers. Breathing pure oxygen brings prompt relief from these prostrating headaches, for which no generally satisfactory treatment has yet been found. The idea of using oxygen came from a layman, Charles E. Rhein of the Linde Air Products Company. For two years, Mr. Rhein told the Mayo Clinic physicians, he had been checking the severe migraine attacks of one of his relatives by having her breathe pure oxygen. She was a patient whom Dr. Alvarez had previously been unable to help by any known form of treatment. Using the mask devised by Drs. W. Boothby, W. R. Lovelace and A. L. Bulbulian of the Mayo Clinic, which is now being installed on transport planes for use at high altitudes, Dr. Alvarez tried oxygen inhalations for other migraine patients. In one case inhalation of oxygen for one hour brought prompt relief. Another patient who had had frequent migraine attacks for years has not had a bad headache since she has started breathing oxygen at the beginning of a spell. Headaches which are not typically migrainous, however, are not helped. The cost of the treatment after initial expense of the inhalation apparatus is not much and with the Boothby-Lovelace-Bulbulian mask patients can talk, and if not too badly prostrated, can sit up and read or do some work.—*Science News Letter*, April 22, 1939.

THE TREATMENT OF SEVERE CASES AND COMPLICATIONS OF VARICOSE VEINS IN THE LEGS*

BY IRVING D. KITCHEN

Toronto

SINCE the injection treatment of varicose veins of the lower extremity has again come into vogue it has been found that a high percentage of large varices, especially those extending above the knee, reappear in a comparatively short time after injection. This is irrespective of the sclerosing solution used.

Consider for a moment the normal blood flow in the superficial veins of the leg. Starting in the medial and lateral marginal veins of the foot the blood passes up the long and short saphenous veins, to empty into the deep veins at the fossa ovalis and popliteal space respectively. At frequent intervals in the leg and at two or three points in the thigh some blood passes through communicating veins from the superficial to the deep set. These communicating veins are guarded by valves allowing flow in one direction only, and it is now felt that it is incompetency of these valves that is the cause for recurrent varices as well as those which do not respond readily to treatment by injection alone.

What occurs then when varices are injected in the presence of incompetent communicating veins? The varices become sclerosed and the blood flow is through the deep set of veins. The flow in these veins is opposed by gravity, and the blood attempts to pass out of the communicating veins and usually succeeds in doing so. This causes either the appearance of varices in previously healthy radicles of the sclerosed veins, or possibly elongation and recanalization of the sclerosed veins themselves. Also when the long saphenous vein is varicosed throughout its entire length, even in the absence of incompetent communicating veins, there is considerable back pressure above the site of the highest injection, which should never be done higher than mid-thigh. Then, for the same reason, namely back pressure, new varices will appear following injection.

Our problem then in the management of these cases is to evolve some procedure that will cure the varices and remove the factors responsible for their recurrence. It has been found that ligation and excision of short sections of vein at certain sites and injection of a sclerosing solution at the same time will accomplish this result. Where the long or short saphenous vein is varicosed and no incompetent communicating veins present, ligation at its entrance to the deep vein and retrograde injection will suffice. Where however incompetent communicating veins are present they must be excised along with a section of the superficial vein, thus preventing outward pressure and escape of blood from the deep veins. This procedure must be followed at each incompetent vein present in the leg, or varices will recur from that point downward.

In my experience the commonest sites where incompetency occurs are in order: just above the knee, just below the knee, and at mid-thigh. The incompetent vein may be found in one of two ways. The simplest is to apply firm digital pressure low down in the leg and then with the thumb of the opposite hand strip the vein upward. When an incompetent communicating vein is reached the varices in the saphenous vein will suddenly fill with blood from above downward. A second method is to elevate the leg, draining the blood from the varices, then apply a series of tourniquets at short intervals, have the patient stand erect, and remove the tourniquets from below upward until the varices suddenly fill. This indicates the incompetency to be between that and the next highest tourniquet. The point of junction of the communicating and superficial veins is marked with some indelible substance such as gentian violet or indelible pencil and the leg prepared for operation.

When the saphenous vein is varicosed above the mid-thigh, and ligation and injection are going to be done at the fossa ovalis it is wise to do a primary ligation just above the knee to prevent sclerosis occurring in the whole vein at once, as this brings about an extensive reaction and is usually quite painful and may incapacitate the patient for a week or two.

The sites of the proposed ligation and injection having been marked previously with gentian violet, with the patient in an erect posture, the

* Read before the Section of Surgery, Academy of Medicine, Toronto, February 21, 1939.

operation is done under 1 per cent novocaine anæsthesia. The superficial vein is exposed for about one and one-half to two inches, the incompetent communicating branch found, and the veins freed from the subcutaneous tissues. Clamps are placed one inch apart on the superficial vein and on the communicating vein and the intervening section excised. The cut ends are transfixed and tied with number one plain catgut, and the second tie is placed a little further along the vein so that no catgut is in the lumen of the patent vein. The clamps are removed, the ends of the vein dropped into the wound, and the skin closed. When the injection is to be made at the same time a cannula is inserted into the distal cut end and the sclerosing solution injected, the cannula withdrawn, and the end of the vein tied in the manner just described. It is important when sodium ricinoleate is being used that no solution gets into the wound, as it will set up a cellulitis which is quite distressing to the patient, and delays healing of the wound.

Following this procedure the patient should be in bed for twenty-four hours, with large warm magnesium sulphate compresses on the whole leg below the site of ligation. He may, however, be allowed up four hours after the operation to the bathroom, and may resume sedentary work after forty-eight hours. This procedure frequently scleroses all varices distal to the site of ligation if they are not extremely large. If this does not occur injection treatment of any few remaining varices may be carried out in the usual manner.

In my series of 12 cases treated in this manner the average number of subsequent injections was 1.83 per leg. One leg required six injections after operation, and in three all the veins became completely sclerosed immediately, so no further treatment was necessary.

When the saphenous vein is varicosed as high or higher than mid-thigh the most satisfactory results are obtained by ligating and excising a section of vein with its communicating branch just above the knee, then immediately proceeding with the ligation and injection at the fossa ovalis. Here there are special considerations. The saphenous vein must be ligated above the entrance of its three tributaries, the superficial circumflex iliac, the superficial epigastric, and the superficial external pudendal veins. This means that each of these veins must be identified, clamped, and ligated, as well as the saphenous vein being ligated immediately at the entrance into the femoral vein. The section of the vein removed is at the junction of the tributaries with the larger vein. Should this procedure not be followed varices will appear on the medial and lateral sides of the thigh due to back pressure through the radicles of the superficial circumflex iliac into the lateral femoral circumflex and superficial external pudendal, into the medial femoral circumflex veins, and thus defeat the purpose of the operation. Following ligation at this site injections are carried out into the distal cut end of the vein, and will bring about sclerosis as far down as the site of ligation at the knee. The procedure is not difficult, but the details must be accurately carried out to obtain satisfactory results.

Finally, a few words regarding the indications and contraindications for this procedure. Ligation and excision of a portion of vein is indicated except when some primary pathological condition is obstructing the return flow from the extremity, such as a pelvic tumour, etc. A previous deep phlebitis is not necessarily a contraindication, as these veins recanalize and the superficial veins may be ligated if necessary; those showing active inflammation in the groin, and those which are complicated by an ulcer, particularly if hæmolytic streptococci can be demonstrated in it. Practically all untreated ulcers are infected, and organisms are lurking in the inguinal lymph nodes and will cause infection in the wound in the groin if disturbed by operation. For this reason, cases showing ulceration should not be subjected to ligation until the ulcer is healed, or it has been shown to be bacteriologically clean for a considerable time. This may be accomplished by the application of antiseptic compresses, preferably 1:3,000 acriflavine solution.

The procedure just described will not suffice in the treatment of ulcerated and old scarred legs, where the slightest trauma or even no trauma at all causes indolent ulcers. The contraction of the scar tissue has impaired the blood and lymph supply, and steps must be taken to improve the blood supply and at the same time remove the scar tissue and devitalized skin and replace it with normal healthy skin. This is what is known as the Kondolean procedure.

The patient should be confined to bed in an attempt to heal the ulcer, if one is present, and to get the extremity free from infection. The skin is incised from the knee to the ankle over

the course of the long saphenous vein, and the vein, a strip of underlying deep fascia, all scar tissue, and devitalized skin are excised, leaving a bed of healthy muscle. Our problem now is to cover this denuded area with healthy skin. This is done by skin-grafting and I prefer a full thickness sieve graft rather than a Thiersch graft, as there is less scar-tissue formation, and as a result a more resistant skin on the grafted area. The day prior to the operation the amount of skin to be excised is estimated and mapped out on the leg. A pattern is then cut from cellophane approximately half as big again as the area to be grafted, and is transferred to tinfoil. The increased size is to allow for shrinkage of the graft when removed and so that there will be little tension when it is stitched in place.

After the first stage of the operation is completed, that is the excision of the vein, fascia, and scar tissue, the prepared pattern is placed on the thigh and the skin incised around it through its full depth. A die, one-half inch in diameter with a sixteenth of an inch protecting flange, is now used at intervals of 1.5 cm. again cutting through the full thickness of skin. A fine-bladed knife is inserted with its point peripherally into each die-cut in turn, and with a sawing to and fro motion carried through an arc of 180°, removed, turned, and carried through the other half of the circle, so when this is completed the graft is readily lifted from the underlying tissues by dividing any few remaining strands.

Any small areas of fat are removed from its under surface and the graft is stitched accurately with interrupted sutures to the area on the leg prepared for it. On it are now placed a few layers of gauze impregnated with vaseline. Over this is placed sponge rubber which extends just beyond the graft, that is, just beyond the suture line of graft and skin of the leg. The leg is now enclosed in a bandage of the crepoplast type, and the patient returned to bed, where he must remain for a period of three to six weeks. The dressing is left undisturbed for ten days unless there is a rise in temperature or the patient complains of pain, both of which are unusual and are indicative of the presence of infection. On removing the dressings the graft usually presents a healthy pinkish appearance. Alternate stitches may be removed and the dressing as before applied for four to five days, when the remaining stitches are removed. It is important to keep the leg supported by a firm bandage and elevated for three to four weeks, then lowered for short intervals, with the bandage still in place for a further two weeks at least, to prevent a late sloughing of areas of the graft. By this method excellent results may be obtained, but careful and intelligent after-care is as essential as the details of the operation itself.

This procedure has three chief advantages: there is little resulting scar-tissue formation and the graft is pliable and resistant to injury; large areas may be grafted, as the numerous small islands at the parent site of the graft soon epithelialize the denuded area; the holes in the graft itself allow escape of exudate, so that the whole graft is in contact with its bed; these holes are usually covered by epithelium in two to three weeks. Finally, I would say, there is only one disadvantage, that is the length of time the patient is incapacitated, which is seldom less than eight weeks. However I do not feel this to be excessive when one considers the stable resistant skin which replaces the old tissue paper-like epithelium which is so sensitive to the minutest degree of trauma.

STAGNATION OF BLOOD IN UPPER EXTREMITIES.—This interesting condition has been termed "claudicatio intermittens venosa" by Löhr, who believed it to be due to the strangulation of veins by fascia during excessive muscular exertion. The author has seen seven such cases, and in one of them the subclavian vein was found to be thrombosed, while in another case its wall was thickened. In a further four cases venous thrombosis was suggested by the clinical signs but was not verified by operation. An increase in the number of blood platelets and a shortening of the bleeding and coagulation times may be noted. It is suggested that in the absence of a uniform pathology the condition should simply be called stagnation of blood.—Kerlyn, K. E.: *Bruns Beitr. z. klin. Chir.*, 1939, **169**: 299.

PERIPHERAL VASCULAR COMPLICATIONS IN PROSTATIC SURGERY*

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CIRCULATORY disease as a factor contributing directly or indirectly to the mortality of prostatectomy has been more than amply considered, with the chief emphasis being placed on the heart. Phlebitis, thrombo-phlebitis and pulmonary embolism are not uncommon complications following parturition and certain surgical procedures, especially so in the case of prostatectomies where an intricately rich periprostatic venous plexus is developed. These observations, together with some recent hæmatological studies in the literature, have prompted me to discuss this problem. I also wish to report three cases of fatal pulmonary embolism in a series of 100 cases of prostatism in our service.

Anatomy.—The vesical plexus of veins lies on the outer surface of the muscular coat of the bladder at the fundus and the sides. It receives tributaries from the mucous and muscular walls and its efferent vessels terminate in the prostatico-vesical plexus. This plexus is distributed around the prostate and the neck of the bladder, and is enclosed between the proper fibrous sheath capsule of the prostate and its sheath of recto-vesical fascia. The largest veins are found just above the prostate and in the region where the ureter reaches the bladder. These veins open into the hypogastric veins which merge with the external iliacs to form the common iliac vein. The right and left iliac veins unite to form the inferior vena cava (Cunningham[1]).

Pathology.—Thrombosis is coagulation within the vascular system during life. It is commoner in the venous than the arterial system. The slowness of the blood stream in a vein is here the important factor. The site is often in connection with a valve or some thickened patch in the intima. The thrombus in its growth extends inward from the wall of the vessel ultimately occluding the lumen. Thrombi in the femoral or iliac veins may measure several inches in length. Such a thrombus may become detached and be carried to the lungs, giving rise to fatal pulmonary embolism. Venous thrombosis usually occurs when the vein is involved in a chronic inflammatory process or when a septic inflammation reaches it (Muir[2]).

Theories of mechanism.—There are two fundamental factors involved in thrombosis, infection and sluggish circulation. In prostatism infection is always present. A distended bladder over a period of time is a fertile field for bacterial invasion. Again, the opening of an already infected bladder (cystotomy) gives rise to perivesical infection. Scott,[3] in reporting a series of blood stream infection in urology, lists 15 fatal cases in which there was a positive blood culture at the time of death. Two of them had pronounced thrombo-phlebitis of the femoral and iliac veins. He concludes that blood stream infections occur much more frequently in urological states than is generally supposed and that in the majority of the cases presented the blood stream infections were post-operative. Dietrich states that thrombosis is not merely a mechanical process. There is a biological balance between the vessel wall, blood, and circulation. If for any reason this balance becomes disturbed then phlebitis or embolism results. Cramer[4] considers thrombosis as an allergic disease and compares it to serum sickness. He quotes Nieberle's experiments with animals wherein he showed that repeated resorption of bacteria can excite in the intima of the vessels an allergic reaction in this connection a thrombosis of the wall can be produced. He finally suggests that both post-operative and post-partum thrombosis should be considered more as the formation of antibodies with wound resorption rather than resorption of bacterial toxins. Chute[5] says that the varicosity of veins, the tired heart and poor circulation, the mild infection and sepsis associated with operations in elderly people predisposes them to this fatal complication. Seng[6] found that there was no definite relationship between pulmonary embolism and blood pressure. There were 6 deaths from pulmonary embolism (28 per cent) in his series. One occurred in the low, three in the normal, and two in the high pressure group. There was an additional case of phlebitis in the low pressure group, but the cause of death was ascribed to pneumonia. Two in our series

* From the Urological Department, Jewish General Hospital, Montreal.

had subnormal and one had high blood pressure. These statistics on the contrary emphasize a definite relationship of pulmonary embolism to blood pressure, that is, that persons with low blood pressure are more prone to phlebitis and pulmonary embolism, whereas high blood pressure patients are less susceptible to these complications.

Heparin and thrombosis.—Murray and Best[7] have given routinely 222 patients heparin after operation for two weeks by saline drip. The experiment is interesting though they do not commit themselves as to the efficacy of the procedure in the prevention of thrombosis. However the danger of post-operative bleeding, which can reach fatal proportions, is ever present. This is particularly true in cases of prostatectomy where the resulting bleeding may be encouraged by retarding the coagulability of the blood when heparin is administered one hour after enucleation of the prostate. The cost of the drug is prohibitive as a routine treatment.

Incidence.—Thrombosis-embolism as a fatal complication occurs in 2 to 7 per cent following prostatectomies. Seng in a series of 514 cases of prostatectomies records 60 deaths; 6 were due to pulmonary embolism. There was an additional case of phlebitis, but the cause of death was ascribed to pneumonia. Swan and Mintz[8] report 10 deaths in 170 prostatectomies; 2 were pulmonary and 1 cerebral emboli. Dakin[9] claims 1 per cent mortality due to embolism. Chute in a criticism of these statistics places the incidence as much higher. In the largest recorded series of cases 6,182 of abdominal and chest operations Cramer lists 153 cases of thrombosis, 7 per cent followed prostatectomies, 7.6 per cent rectal operations, 10 per cent hysterectomies, and 15.7 per cent Cæsarean section.

Symptom-complex.—The tragic suddenness of the onset of pulmonary embolism is most harrowing to the surgeon. It occurs usually when the patient has had an uneventful convalescence and is about to be discharged. The patient complains of a severe pain in the chest, he is cyanotic, his pulse becomes feeble, respirations laboured; often breathing ceases before the heart action. The whole episode lasts a few minutes. Other patients develop pneumonic consolidation which fundamentally is pulmonary embolism from which they may recover to succumb later to another attack. This is well exemplified by the second case in our series.

Preventive treatment.—Any patient complaining of pain in the leg post-operatively, even where the findings are negative, should be immediately sent back to bed and his foot elevated as a precautionary measure. The small daily spikes of fever when present towards the end of convalescence are symptomatic of a lurking mild sepsis, and no patient should be permitted to leave his bed under this condition even at the risk of developing hypostatic pneumonia. A routine blood clotting-time estimation and the injection of heparin are valuable prophylactic measures.

CASE 1

No. 14448; male, aged 69, was admitted to the Jewish General Hospital on June 7, 1938, with acute urinary retention and hæmaturia. Catheterization yielded 1,000 c.c. of bloody urine. Physical examination disclosed a soft blowing systolic murmur at all orifices of the heart. Blood pressure 175/85. Genito-urinary system.—The prostate per rectum was moderately enlarged and glandular. Blood chemistry tests gave normal figures. The cystogram showed a small trabeculated bladder with elevation of the base. Temperature 101°; pulse 84; respirations 25.

Suprapubic cystotomy under local novocain anæsthesia, 1 per cent, was done on June 10, 1938. On the 4th day after operation the temperature dropped to normal except for slight spikes to 99° in the afternoons. The pulse was between 75 to 90; respirations at 20. In general the man was doing well. On the following day he complained of pain in the left thigh. Examination was negative but routine precautionary measures were instituted. On June 18th, 8 days after operation, he expired suddenly following a bout of rapid respirations without changing the colour of his face.

Autopsy report.—Venous system: section of the vena cava from above downwards revealed that the common iliac veins contained thrombi, some of which were long and thin, others, shorter and thicker. These thrombi were adherent to the walls, and their free extremities projected into the vena cava. Heart: on opening the right ventricle several long thin thrombi were found which penetrated into the pulmonary artery and extended beyond the bifurcation into both branches. These thrombi measured 14 x 16 cm. in length, and varied in diameter from 3 to 7 m.m.

CASE 2

No. 12854, male, aged 69, admitted to the Jewish General Hospital on January 30, 1938, with urinary frequency and difficulty of urination. Physical findings: residual urine 2 oz.; blood pressure 94/56. Prostatic examination per rectum and the cystogram pointed to an enlarged prostate. Suprapubic cystotomy and bilateral vasectomy were done under local anæsthesia on February 5, 1938. On the 4th day after operation his temperature became normal. The following day he developed fever. Pulmonary infarction was considered, but an x-ray of the chest suggested broncho-pneumonia. The patient recovered from broncho-pneumonia, and his temperature dropped to normal. On February 26th, at 2.30 a.m., the patient complained of dyspnœa. Examination revealed a very weak pulse; he was cyanotic and could hardly speak. These symptoms become aggravated and he expired within a few minutes.

Diagnosis. — Prostatism; hypertension; broncho-pneumonia; thrombo-phlebitis of the pelvic veins; pulmonary embolism. An autopsy was not obtained.

CASE 3

No. 12810, male, aged 73, was admitted to the Jewish General Hospital with acute urinary retention

on February 17, 1938. Physical examination: blood pressure 112/70; tender internal hæmorrhoids, the prostate moderately enlarged and glandular. There was a large left inguinal hernia extending into the scrotum. Arteriosclerotic heart-disease.

On February 18th suprapubic cystotomy was done under local anæsthesia. The patient was very uncooperative and kept infecting the wound. His temperature was of a low-grade swinging type, which persisted throughout. On March 24th he developed pain and swelling of the left leg below the knee. Routine treatment for thrombo-phlebitis was instituted. On April 2nd the other leg became swollen. He became markedly cyanotic on April 24th. He developed a tracheal rattle and expired on the following day. An autopsy could not be obtained.

SUMMARY AND CONCLUSION

1. In discussions of the mortality in prostatectomies emphasis is placed on the heart, whereas the peripheral circulation is assigned an insignificant rôle.

2. Thrombo-embolism as a fatal complication of prostatectomies occurs to the extent of 2 to 7 per cent.

3. The rich periprostatic venous plexus, together with ever present infection in the prostatic patient, makes him particularly susceptible to this complication.

4. The problem is re-examined in the light of some recent hæmatological research.

5. Three deaths from pulmonary embolism are here reported in a series of 100 patients with prostatism all operated upon.

6. Contrary to the consensus of findings the three deaths followed the first stage (cystotomy) in our series and not the enucleation of the prostate.

7. There is a definite relation between blood pressure and embolism.

I am indebted to Dr. Max Ratner, Chief of Department, for valuable assistance.

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ARTIFICIAL PNEUMOTHORAX

(A 5-YEAR REPORT)

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THIS report will analyze the results of artificial pneumothorax treatment during the 5-year period, October 1, 1932, to September 30, 1937, as practised at Freeport Sanatorium, Kitchener, and will consider some observations on pleural effusions.

Selection of patients and the initial introduction of air were made according to accepted practice. Additional air was then given three times weekly in amounts of 250 to 300 c.c. until the desired degree of collapse was attained. Preferably final pressures were kept sub-atmospheric or at the most slightly positive. When less air was required the volume of each refill was decreased or the refill interval gradually lengthened. In some patients higher positive pressures were necessary to obtain clinical response. Daily clinical observations, weekly fluoroscopic examinations, and periodic office studies were made with all patients.

Small amounts of air at short intervals promote a lower, more even and therefore more efficient pressure, putting less severe and more gradual tension on adhesions, are less embarrassing to the function of lungs and heart, and are less likely to induce reaction in the sensitive pleura. During this period artificial pneumothorax was attempted on 181 lungs of 171 patients, with 37, or 20 per cent, failures. In 134 patients 144 successful pneumothoraces were induced, 12 of these being bilateral cases, two of which had been started on one side prior to this period.

	Right	*Left*	*Bilateral*	*Total*
Male	31	24	3	58
Female	29	38	9	76
	60	62	12	134

The distribution of cases according to age and sex follows:

	Males	*Females*
Under 15	1	1
16 – 20	5	19
21 – 30	28	32
31 – 40	13	16
41 – 50	8	3
51 – 60	3	2
61	0	3
	58	76

On initiating collapse therapy the classification of the 134 cases was (National Tuberculosis Association):

		Percentage
Minimal	6	4.5
Moderately advanced	61	45.5
Far advanced	67	50.0

Closure of cavities and the conversion of sputum from positive to negative seem fair criteria for successful collapse therapy. The 134 patients are classified as having (1) no cavity; (2) a cavity closed; or (3) a cavity not closed.

Status (N.T.A.)	*No cavity*	*Cavity closed*	*Cavity not closed*
Apparently cured	1	2	–
Arrested	15	11	–
Apparently arrested	2	8	–
Quiescent	8	8	1
Improved	10	11	11
Unimproved	–	1	18
Dead	2	1	24
	38	42	54
Sputum			
Converted to negative	16	37	–
Always negative	17	5	3
Always positive	5	–	51

Of these patients with no cavity 26 out of 38, or 68.5 per cent, were quiescent or better. Of those with cavity closed 28 out of 42, or 69 per cent, were quiescent or better. This striking similarity of outcome shows the value of cavity closure. Those with cavity not closed were largely far advanced cases, 41 of the 54 being in this classification.

There were 25, or 18.6 per cent, with no sputum or with sputum negative for tubercle bacilli. Culture methods were not available for the earlier part of this group when the direct smear, repeated, was used. Of the 109 sputum-positive cases 53, or 48.6 per cent were converted to sputum-negative for tubercle bacilli on culture.

Artificial pneumothorax did not alone achieve this result. The following supplementary procedures were indicated and used:

Pneumolysis	3
Phrenicectomy	9
Phrenic crushing	4
Thoracoplasty—partial	2
complete	3
Terminal oleothorax	2

Fluid formation occurred in 108 cases, or 75 per cent of the group, and in one-half of these was a troublesome complication.

	Cases	*Percentage*
Slight fluid formation	55	38
Moderate " "	23	16
Massive " "	30	21

Included in the 38 per cent of cases were those in which fluid was observed in the costo-phrenic sulcus only. About one-half of these were afebrile; the remainder had elevations of temperature to little more than 99 degrees for very short periods. These small collections of fluid remained several weeks to months in some cases, and in others were present at a single observation only. In a few of this group these small amounts of fluid returned once to several times for short intervals during the course of treatment. Their presence apparently did not influence the outcome in any case, so may be considered unimportant.

Fluid formation of a serious character was present in 53, or 37 per cent of the total pneumothoraces. Almost one-half of these occurred during the first two months, and almost three-quarters during the first year. The onset of these pleural effusions was either slow, with gradual daily elevations of temperature, or sudden, with high fever and very speedy filling of the intrapleural space. Considerable pain usually occurred in the chest and sometimes in the abdomen. Some patients however remained unconscious of the presence of fluid and were without fever or discomfort. In either type of case intrapleural interference was withheld unless the fluid was causing discomfort; then air or fluid was aspirated to relieve the pressure.

Those cases in which the effusion more than filled the sulcus but did not rise higher than the third intercostal space at the mediastinum are classed as "moderate fluid formations".

MODERATE FLUID FORMATION CASES 23, OR 16 PER CENT

Treatment		*Febrile (100 F. and over)*	*Afebrile*
1. Left alone	20		
(*a*) Complete absorption		9	3
(*b*) Almost complete absorption.		1	
(*c*) Died of progressive disease..		6	
" of tuberculous meningitis		1	
2. Aspiration with air replacement	3		
(*a*) Complete absorption		1	2
		18	5

The above table shows that of those 18 febrile cases in which the fluid did not rise above the third intercostal space at the mediastinum, 11 have had the fluid absorbed and 7 have died.

MASSIVE FLUID FORMATION CASES 30, OR 21 PER CENT

Treatment		*Febrile (100 F. and over)*	*Afebrile*
1. Left alone	9		
(*a*) Absorption complete		3	1
(*b*) Died of progressive disease		5	
2. Aspiration with air replacement.	21		
(*a*) Absorption complete		5	2
(*b*) Absorption unsatisfactory ..		14	
		27	3

Of the 8 afebrile cases in the above two groups all absorbed completely regardless of the amount of the effusion. The majority of the 27 febrile cases of massive effusion had a poor prognosis. Of the 8 who had complete absorption only 4 seem likely to recover.

Tuberculous empyema occurred in 11, or 41 per cent, of these 27 cases. Complete unilateral thoracoplasty was done on 3 with cure for the empyema and adequate collapse for the underlying diseased lung. Of the remainder 3 might benefit from surgery, 3 are hopelessly ill, and 2 are dead.

Of the 144 pneumothoraces 45, or 31 per cent, developed pleural effusions accompanied by toxic symptoms of varying degree. One-half of the latter, or 15 per cent, of the artificial pneumothoraces in this series died or appeared to have a hopeless outlook.

The following table is presented for a study of the final true pressures and their relationship with the formation of fluid:

True pressure	*Negative*	*Less than plus 1 cm.*	*Plus 1 to plus 5 cm.*	*Plus 5 to plus 20 cm.*
No fluid	7	5	11	13
Slight fluid	15	7	22	11
Moderate fluid.	3	6	6	8
Massive fluid .	6	7	10	7
	31	25	49	39
Total			144	

The first two groups were maintained at negative or slightly positive final pressures, and 22, or 39 per cent, developed fluid of moderate or massive degree. The remaining 88 were in the high pressure group, and 31, or 36 per cent, were involved in a like complication. The almost identical percentages in these two pressure groups seem to show that positive final pressures alone are not the cause of serious fluid formation.

Unsatisfactory collapse seems to favour the formation of fluid. In 71 such cases the incidence of moderate and massive effusions was 45.5 per cent. The other 73 had satisfactory compression, and 28.5 per cent had this complication. Unsatisfactory collapse is due most frequently to the presence of adhesions. Less than 3 per cent of these 134 patients had no evidence of adhesions in stereograms or in fluoroscopic examinations. String or band-like adhesions may not, even if moderately extensive, prevent a partial collapse of adequate clinical benefit. Cavity closure appears to depend on the size and position of the cavity, the character of its walls, the presence of adhesions, their position, extent and character. If not too complex and extensive adhesions quite often relax enough under sub-atmospheric pressures to allow approximation of the walls of some types of cavity with healing.

Many artificial pneumothoraces have pleuræ which are relatively free throughout. There were 91 in this group with final true pressures varying from sub-atmospheric to highly positive at 20 cm. of water, permitting free even collapse of the lung. Massive and moderate effusions occurred in 37.5 per cent of those in which the final pressure was negative or slightly positive compared to 49.2 per cent in which the final intrapleural pressure was highly positive.

Bilateral pneumothorax was carried out in 12 cases, or 9 per cent, of this series. In some individuals the first side had been stabilized on a weekly or longer interval, and it was a simple procedure to carry on in the other side as previously outlined. In those more active cases where prompt action was necessary no hesitation was felt in commencing the second side even if the first had not been stabilized. Four refills weekly were administered when necessary, two on either side, and the interval lengthened as soon as possible. Both sides were never done on the same day. Five are now under treatment and appear to have a good prognosis. Of the

remainder four are dead and three are hopelessly ill.

The status of these 134 patients on September 30, 1938, follows:

	In sanatorium	*Discharged*	*Totals*	*Percentage*
Apparently cured	–	3	3	2.2
Arrested	1	25	26	19.4
Apparently arrested ..	–	10	10	7.5
Quiescent	6	11	17	12.7
Improved	25	7	32	24.0
Unimproved	12	7	19	14.1
Dead	–	27	27	20.1
	44	90		

SUMMARY

1. A method of artificial pneumothorax has been described.

2. Failure to induce artificial pneumothorax in 181 attempts occurred in 37, or 20.5 per cent.

3. Successful induction was carried out in 134 patients, 58 of whom were males and 76 females: minimal 6, or 4.5 per cent; moderately advanced 61, or 45.5 per cent; far advanced 67, or 50.0 per cent.

4. Cavity closure was accomplished in 42 of the 96 cases, or 44 per cent.

5. Sputum was absent or negative for tubercle bacilli in 25, or 18.6 per cent. Sputum was converted to tubercle bacilli negative on culture in 53 of 109, or 48.6 per cent.

6. Some observations on pleural effusion. Over a third of this group had fluid only in the costo-phrenic sulcus. Positive intrapleural pressures *per se* did not seem to be the cause of fluid-formation. Unsatisfactory collapse seemed to favour greatly the formation of fluid. In a relatively free pleural space effusion occurred more often with positive final pressures.

7. Fluid formed in 75 per cent of the 144 pneumothoraces. Of all these 15 per cent developed effusions, and died or appeared to have a hopeless outlook, one-half having had tuberculous empyema.

8. In only 3 per cent of 134 patients were no adhesions discerned.

9. Of the 134 patients, 29.1 per cent are apparently arrested or better; 12.7 per cent are quiescent; 34.2 per cent are unimproved or dead.

PRENATAL CARE

(AN ELEVEN YEAR STUDY OF THE DALHOUSIE UNIVERSITY PUBLIC HEALTH CENTRE PRENATAL CLINIC)

BY A. L. MCLEAN, M.D., C.M., C.P.H. AND W. G. COLWELL, M.D., C.M.

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THE Dalhousie University Public Health Centre was opened in 1925 as an outpatient clinic for the purpose of administering medical aid to the poor of the City of Halifax and to provide teaching facilities for the University Medical School. The prenatal clinic at that time was under the direction of Dr. E. K. Maclellan, Professor of Obstetrics, and provided prenatal care and home-delivery service, the latter for multiparous women. This home-delivery service has been conducted by final year medical students under the supervision of an attendant obstetrician. Dr. Maclellan carried on this work until the fall of 1928, when he was succeeded by W. G. Colwell.

An outline of the procedure followed in the prenatal clinic is as follows. On the patient's first visit a careful personal, family, and menstrual history is recorded, and, if a multipara, a detailed account of previous pregnancies, labours and puerperia. A complete physical examination is made, and if any non-obstetrical abnormality is found or suspected the patient is referred for consultation, advice, and treatment to one of the special clinics. A complete obstetrical examination is also carried out, including pelvic measurements and a diagnosis of the stage of pregnancy. Although it has always been routine to take blood for serological investigation of syphilis the examination of smears from the urethra and cervix for gonococcus infection was not carried out during the period of the study under observation. The estimation of the blood pressure, urinalysis, and a record of the patient's weight is made on each visit. Nursing assistance at the prenatal clinic is provided by the Victorian Order of Nurses and the Grace Maternity Hospital. The former visit all patients in their homes from time to time, and in the case of those to be confined at home advise the clinic staff whether or not home conditions are satisfactory for the delivery. It is a rule

that primiparæ must be confined in hospital, but multiparæ may be confined at home, providing conditions are satisfactory and a normal labour is anticipated. No abnormal case is delivered in the district, except when delivery is imminent and the patient cannot be taken to hospital.

The Victorian Order of Nurses hold a hygiene class immediately before each clinic in which the prospective mothers receive instruction in the following: diet, particularly with reference to vitamin and mineral requirements, clothing, care of the person, exercise, preparation of the home for confinement, and the care of themselves and baby during the puerperium. The average number of classes attended by each patient is four. Patients as a whole are co-operative in returning for subsequent visits during their pregnancy, but in order to further encourage this a social service follow-up has been used by means of letters and home visits.

Fourth year medical students are in attendance upon these clinics twice weekly for a period of six weeks and, in addition, a final year intern is always present. All home deliveries are conducted by final year medical students under supervision of the obstetrical staff, and in addition these students also deliver a large percentage of the hospital cases.

The remainder of this paper presents the results of a statistical analysis of recorded data on 1,132 pregnancies (237 primiparæ and 895 multiparæ) in 790 women who attended the prenatal clinic for care and advice during the years 1925 to 1935, inclusive.

The number of women attending the clinic has increased from an average of 33 per year during the first four years to an average of 211 per year for the years 1933 to 1935. Likewise there has been during these same years an increase in the average number of visits per pregnancy, from 3.3 during the former to 4.2 during the latter. Twenty-one per cent of patients have been primiparæ.

Endeavour has been made to contact patients as early in pregnancy as possible. To bring this about, those who refer cases, particularly the Victorian Order and clinic nurses, have been instructed to refer new cases early, while patients attending the clinic are advised to return as early as possible in subsequent pregnancies. Although special effort has been made along these lines, only 16 per cent of all patients (10 per cent primiparæ and 18 per cent multiparæ) presented themselves for care before the fifth month of pregnancy.

Table I shows the number and percentage of multiparæ and primiparæ delivered in hospital during different periods of the study.

TABLE I.

THE NUMBER AND PERCENTAGE OF CONFINEMENTS IN HOSPITAL

Years	*Multiparæ*			*Primiparæ*		
	Total pregnancies	*Delivered in hospital*	*Percentage*	*Total pregnancies*	*Delivered in hospital*	*Percentage*
1925-28	113	37	33	21	17	81
1929-32	287	111	39	78	56	72
1933-35	495	215	44	138	127	92
Total	895	363	40	237	200	84

It will be noted from the above table that 40 per cent of multiparæ and 84 per cent of primiparæ attending the prenatal clinic were delivered in hospital. Of the 37 primiparæ not delivered in hospital two, on account of an infectious disease, were delivered in the home by the clinic staff, and the remainder by private physicians.

The results of 1,058 pregnancies, according to place of confinement, are shown in Table II.

TABLE II.

THE RESULTS OF DELIVERIES IN HOSPITAL AND THE HOME

	Hospital		*Home*	
	Number	*Percentage*	*Number*	*Percentage*
Full term, living.....	498	88.4	447	90.3
Premature, living....	39	6.9	25	5.0
Stillbirths.....	20	3.5	14	2.8
Abortions.....	6	1.1	9	1.8
Total.....	563	99.9	495*	99.9

*No record for 74 confinements in the home.

It will be noted from this table that 95.3 per cent living births were recorded in both hospital and home deliveries. Of the 495 home confinements, 82 per cent of multiparæ and 2 primiparæ (due to infectious disease), were attended by the Dalhousie Clinic staff, the remainder by private physicians.

The results of 1,058 pregnancies in 790 women receiving prenatal care, and 1,820 other pregnancies, in these same women, without prenatal care, are compared in Table III.

TABLE III.

THE RESULTS OF 1,058* PREGNANCIES WITH PRENATAL CARE AND 1,820 PREGNANCIES WITHOUT PRENATAL CARE IN 790 WOMEN

	With prenatal care		*Without prenatal care*	
	Number	*Percentage of total*	*Number*	*Percentage of total*
Full term, living	945	89.3	1,568	86.1
Premature, living	64	6.0	36	2.0
Stillbirths	34	3.2	66	3.6
Abortions	15	1.4	150	8.2
Total	1,058	99.9	1,820	99.9

*No record for 74 confinements.

The above table shows a percentage of 95.3 living births in those receiving prenatal care, and 88.1 per cent for those having no prenatal care, a statistically significant difference. The difference in the abortion rate is also statistically significant.

The effect of prenatal care on fetal mortality is observed when the results of 1,058 pregnancies in women receiving prenatal care and 1,820 pregnancies in these same women without prenatal care are compared. A fetal mortality rate of 4.6 per cent was noted for the former and 11.9 per cent for the latter, being significantly higher for the group receiving no prenatal care.

The serological results for syphilis were recorded for 669 of the 790 women attending the clinic, 14 per cent giving a positive Kahn reaction. In order to compare the effect of syphilis on pregnancy in positive and negative reactors the results of 2,429 pregnancies were tabulated, and these results are shown in Table IV.

TABLE IV.

A RECORD OF 2,429 PREGNANCIES CLASSIFIED AS TO THE SEROLOGICAL TEST FOR SYPHILIS

	Positive tests		*Negative tests*	
	Number	*Percentage of total*	*Number*	*Percentage of total*
Full term, living	260	78	1,844	88.0
Premature, living	20	6	74	3.5
Stillbirths	30	9	62	3.0
Abortions	23	7	116	5.5
Total	333	100	2,096	100.0

It will be seen from this table that the difference in percentage of living births is definitely higher and the stillbirth rate definitely lower in the negative group. Both these facts are statistically significant.

Fetal deaths were also shown to be significantly higher among women with positive Kahns. An analysis of 2,429 pregnancies (333 with positive Kahn and 2,096 with negative Kahn) showed a fetal mortality rate among positive reactors of 15.9 per cent, nearly double that of negative reactors, 8.5 per cent.

The different types of delivery in 1,022 confinements occurring in the home and hospital are recorded in Table V.

TABLE V.

TYPES OF DELIVERY IN 1,022* CONFINEMENTS IN THE HOME AND HOSPITAL

Type of delivery	*Deliveries in home*		*Deliveries in hospital*		*Total*	
	No.	*Percentage*	*No.*	*Percentage*	*No.*	*Percentage*
Normal, spontaneous	452	89.5	489	86.9	941	92.1
Low forceps	3	0.6	30	5.3	33	3.2
Medium forceps	0	...	9	1.6	9	0.9
Breech	4	0.9	17	3.0	21	2.0
Missed abortion	0	...	1	0.2	1	0.1
Induced labour	0	...	1	0.2	1	0.1
Cæsarean section	0	...	16	2.8	16	1.6
Total	459	100.0	563	100.0	1,022	100.0

*110 confinements, no record.

From this table it will be noted that 98.5 per cent of home and 86.9 per cent of hospital deliveries were spontaneous. The much higher incidence of low forceps cases in hospital deliveries can be attributed in part to the application of forceps for teaching purposes. A Cæsarean section rate of 1.6 per cent was recorded, and the reasons for this operative procedure were as follows: Funnel pelvis, 6*; disproportion (type unknown), 2; central placenta prævia, 1; brow presentation, 1; flat pelvis, 1; generally contracted pelvis, 1; breech with extended legs, 1; accidental hæmorrhage, 1; pelvic thrombo-phlebitis, 1; and eclampsia (post-mortem Cæsarean), 1.

Pelvic examination of this group of 790 women showed 7, or 0.89 per cent, to have an abnormal pelvis, classified as follows: funnel, 3; generally contracted, 2; simple flat, 1; generally contracted flat, 1.

Information regarding the toxæmias of pregnancy was available for 1,118 of the 1,132 pregnancies. Cases were classified as toxic which showed an elevation of blood pressure accompanied by the appearance of albumin in the urine, with or without œdema, and with or with-

* Six Cæsarean sections in 3 women.

out subjective symptoms. This condition was found to be present in 70 instances, giving a rate of 6.3 per cent, none of which went to the convulsive state.

Three maternal deaths and 1,009* living births were recorded, giving a maternal mortality rate of 2.97 per 1,000 living births. One maternal death was attributed to pulmonary embolism on the eighth day post partum, a district case, confirmed by autopsy; one to moderate post-partum hæmorrhage, rupture of the lower uterine segment following a precipitate delivery in an anæmic woman, and confirmed by autopsy; one death on the operating table during a Cæsarean section for flat pelvis (no autopsy); death was presumably due to anæsthesia. The case of eclampsia (post-mortem Cæsarean), mentioned previously as a reason for Cæsarean section, is not included because this patient attended the clinic but once, at which time she was found to be toxic and was advised to enter hospital immediately. This advice was refused and she was admitted to hospital forty-eight hours later in convulsions and died eight hours after admission.

In order to compile neonatal and infant mortality rates among children born of women receiving prenatal care a nurse was given a list of the 1,009 living births, with instructions to visit each home and to record if the child was still alive, and, if dead, the age and date of death. Information was received regarding 961 of these births. It was found that 51 of these infants had died before reaching one year of age, an infant mortality rate of 53 per 1,000 living births. A comparison of this rate with the average rate for the City of Halifax (rate, 81) over the same period of time reveals significantly fewer deaths among infants whose mothers received prenatal care and instruction. A comparison of the neonatal mortality rate of the clinic group and the rate for Nova Scotia as a whole also shows significantly fewer deaths in infants under one month of age in the former group (rate, 1,978 per 100,000 living births) than in the latter (rate, 3,564 per 100,000 living births).

* No record for 74 confinements.

SUMMARY

The results of an analysis of recorded data of 1,132 pregnancies in 790 women attending the Dalhousie prenatal clinic have been presented and reveal:

1. A steadily increasing number of women attending the clinic for prenatal care and advice, 21 per cent being primiparæ.

2. The average number of visits made to the clinic per pregnancy is increasing, but only 16 per cent presented themselves for care before the fifth month.

3. Forty per cent of multiparæ and 84 per cent of primiparæ were delivered in hospital.

4. Eighty-two per cent of multiparæ and two primiparæ confined in the home were delivered by the clinic staff.

5. The value of prenatal care is demonstrated when a comparison of 1,058 pregnancies with prenatal care and 1,820 other pregnancies in the same women without prenatal care is made. Significant differences are noted in respect to living births, the abortion rate, and the fetal mortality rate.

6. A high incidence of syphilis (14 per cent).

7. A significantly lower living birth rate and significantly higher stillbirth and fetal mortality rates in those having positive Kahn reactions.

8. A high percentage of spontaneous deliveries, a low average forceps rate, and a low Cæsarean section rate (1.6 per cent).

9 A low incidence of both abnormal pelves and toxæmia.

10. A low maternal mortality rate.

11. A significant difference in the infant mortality rate, as compared with that for Halifax City.

12. A significant difference in the neonatal mortality rate as compared with that of the province.

All conclusions have been drawn from data checked by Miss Jean Peabody, statistician for the Department of Preventive Medicine, Dalhousie University.

THE CAUSE OF OLD AGE.—"As the World waxeth old, Men grow old with it: not by reason of the Age of the World, but because of the great Increase of living Creatures, which infect the very air, that every way encompasseth us, and Through our *Negligence* in ordering our Lives and That great *Ignorance* of the Properties which are in things conducing to Health, which might help a disordered way of Living, and might supply the defect of due Government."—Roger Bacon, *The Cure of Old Age and the Preservation of Youth.*

Case Reports

A DERMOID CYST OF THE VAGINA COMPLICATED BY PREGNANCY*

BY H. W. JOHNSTON

Toronto

Early in the spring of 1929 Mrs. M., being great with child, engaged her physician for the confinement. She had had a spontaneous labour three years previously. In May she went into labour. When her doctor attended he saw, to his surprise, a bluish tumour presenting at the introitus. Examination showed the head in mid-pelvis; the tumour preceding it, and attached by a small pedicle to the vaginal vault.

Being called in consultation, I attended in haste. When I arrived the patient had been delivered. It had been an easy labour. The tumour had slipped forward before the advancing head. Examination showed it to be attached to the anterior wall at the junction of the cervix with the vaginal vault. It was attached by a very fine longish pedicle. The cyst was easily removed.

The pathological report was as follows. "A more or less round tumour having the gross appearance of a dermoid. The widest diameter is 4 inches. It has a glistening mottled appearance. The tumour is filled with a thick sebaceous material and matted hair. The wall is thin and smooth, except in one area where hair is growing. Here the wall is ¼ inch thick and contains several small cysts."

This tumour, likely a cyst of Gärtner's duct, was a solitary one, as I examined the patient three months afterwards and no others were to be felt or seen.

An interesting feature in this case was the absence of symptoms. There had been absolutely no history of vaginal distress, appearance of the tumour, etc., at any time during the patient's prenatal period, or indeed before she conceived.

Reviewing the literature I find the following. (1) Cullen, T.: A résumé of vaginal tumours, *Johns Hopkins Hosp. Bull.*, 1905, **16**: 207, "No vaginal dermoid cysts". (2) Bland Sutton, J.: Tumours Innocent and Malignant, Cassell, London, 1917, 6th ed., p. 527, "A dermoid the size of an orange containing hair and arising from the right labium had burrowed below the fascia of the thigh". (3) Curtis, A. H.: *Surg., Gyn. & Obst.*, 1913, **16**: 715, "A dermoid the size of a small orange arising from the vaginal mucosa had become ulcerated and necrotic. It contained hair. It was protruding into the vagina, and arose 2 cm. to the left of the cervix. Curtis was of the opinion that it was a purely vaginal phenomenon, and did not descend from the pelvis.

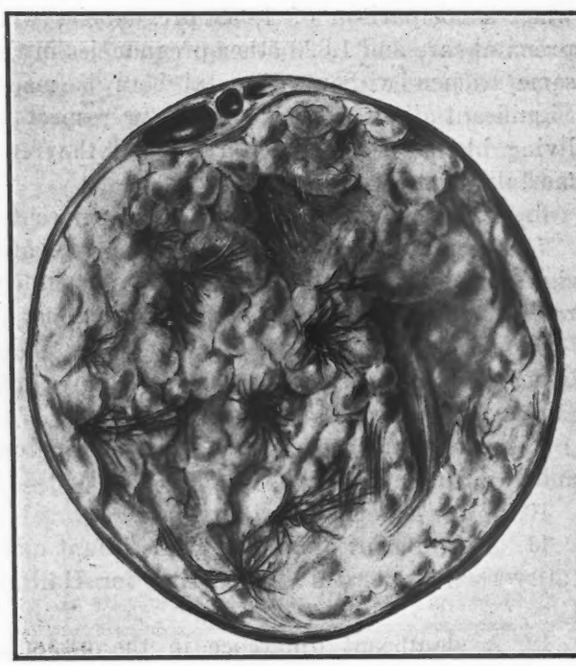

Fig. 1

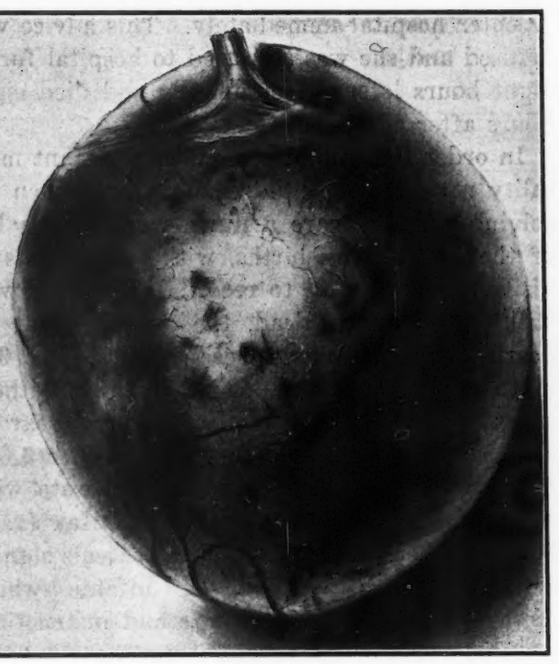

Fig. 2

I saw Mrs. M. again early this winter. She is now at the menopause, and the pelvis is clear.

I am indebted to Dr. J. N. Ferrier for referring this case to me; to Miss McLatchie for drawing the tumour; and to Dr. D. N. Henderson for the pathological report.

* Read at the Section of Obstetrics and Gynæcology, Academy of Medicine, March 5, 1936.

MUCOCELE OF THE FRONTAL AND ETHMOID SINUSES

BY LYNN GUNN, M.D.

Winnipeg

The following case of mucocele of the frontal and ethmoid sinuses is reported because, on reviewing the literature, it is found that this condition is less common than is usually thought.

A mucocele is the distension of one or more walls of an accessory sinus by the accumulation of a mucous secretion which is frequently sterile. This is usually accompanied by a gradual erosion and absorption of the bony sinus wall, with a complete absence of inflammatory symptoms. Mucoceles are usually met with in the frontal and ethmoid sinus regions. Howarth reports a case of one involving the maxillary antrum. In the literature reviewed there is no mention of any case becoming malignant.

The etiology has not been definitely established, but the most probable theories are: (1) that mucocele is due to cyst-formation in the lining membrane of the sinus; or to (2) obstruction of the ostium of the sinus, either from trauma or as a result of previous inflammation.

Diagnosis. — Meningoceles are usually congenital and are found in the mid-line; they can be pressed back into the skull. Dermoid cysts likewise are congenital, but are more solid and less freely movable. Osteoma and fibrosarcoma do not fluctuate and can be differentiated by x-ray examination. Frontal sinusitis may cause an œdema of the upper eyelid associated with chemosis of the conjunctiva and definite nasal symptoms.

CASE REPORT

Mrs. E.M., white, aged 53 years, was admitted to St. Boniface Hospital on February 14, 1939. She complained of soreness over the right frontal region during the last year. Two or three months previously she had noticed a swelling above the right eye, just above and medial to the inner canthus. She did not have any nasal symptoms. There was a cystic swelling at the inner canthus of the right eye extending laterally almost to the mid-line of the orbit. It was apparently attached to bone and not attached to the skin. The mass fluctuated, was non-translucent, non-expansile on coughing, and did not fill on dependency. Nasal examination was negative. Blood count was normal except for slight anæmia. Wassermann test was negative.

X-ray finding.—There was a rounded defect in the upper and medial margin of the right orbit which extended medially into the frontal sinus. The appearance suggested absorption from a soft tumour which had extended to the left of the mid-line.

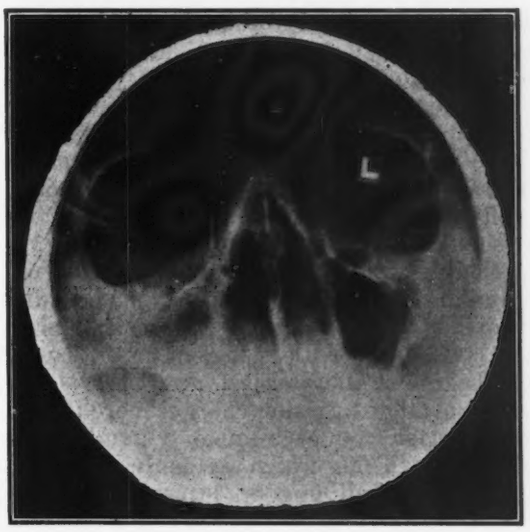

Fig. 1

Operation.—The right frontal sinus was opened externally by making a curved incision along the supra-orbital margin which was carried medially to the inner canthus along the side of the nose. The floor of the frontal and the external wall of the anterior ethmoid sinuses were found to be eroded by the cyst wall. The cyst contained a thick tenacious greenish secretion which was evacuated together with the lining membrane. The frontal-nasal duct was enlarged and a rubber drainage tube was inserted through the nostril. The incision was sutured. No irrigations were used and the drainage tube was removed ten days later.

Pathological report on the contents of the cyst showed no growth after 48 hours' incubation.

The patient had an uneventful recovery and was discharged from the hospital eleven days after the operation.

THE TREATMENT OF BURNS.—Mr. C. W. R. Price writes to the *British Medical Journal*: Two years ago Dr. J. M. Bryson, who was then a house-surgeon at the Royal Salop Infirmary, introduced me to the "lazy man's treatment" for burns, and as this method has stood me in good stead in many cases since I think that a short note in the Journal may be useful to other surgeons. The method simply consists of using tannic acid powder in place of the aqueous or oily solutions of tannic acid usually employed. The burn is cleansed in the ordinary way, and the powder then shaken on to it from a canister or bag of wide-meshed gauze. The exuding serum rapidly forms a coagulum with the tannic acid and no further applications are necessary. This method is also of value in the treatment of the severe facial and other abrasions occurring in road accidents, preliminary cleaning being followed by application of the powder in the same way.

Therapeutics and Pharmacology

THE INTERNIST AND THE OPHTHALMOSCOPE

BY ALEXANDER E. MACDONALD, M.D., F.R.C.S.(C.), D.O.M.S.

Toronto

The many beautiful coloured illustrations of fundus changes which have appeared in books are responsible for the growth of what may be called a picture-gallery idea of diagnosis. The electric ophthalmoscope has made access to valuable information comparatively simple, but it is only one step in a complete eye-examination. An appreciation of the usual difficulties will help to make this short-cut less dangerous.

Physiological fundus variations are as common as differences in facial appearance. So a vision test should be made to show how well the eye is functioning, and it should be a check on the fundus findings. The vision may be considered approximately normal if the patient is able to count the number of "finger-tips" displayed from behind a dark object at 6 metres or 20 feet. A condensed vision chart is more accurate, and one letter from each line of a standard chart (except the 6/60, which is equivalent to the counting of "full fingers") may be made for this distance, to fit into the lid of an ordinary ophthalmoscope case. If the pupil is active a mydriatic should be used, but not in those over forty years of age, where a sluggish oval pupil with the long diameter in the vertical meridian suggests the possibility of increased tension. This danger sign of glaucoma must be looked for, and perimeter fields and tonometer tests are demanded.

Expediency sometimes requires that the fundus examination be made by the physician in surroundings not suitable for the test. Failing a black tent, a pillow, chart, a raised sheet, or a nurse may be placed to shield the eye of the physician and patient from direct light. Then the beam of light from the ophthalmoscope should be directed across the cornea from the region of the external canthus, to see if there are any opacities in front of the iris, such as fine corneal scars or central nebulæ, which cause marked visual loss, and blur the observer's view. Dots on the corneal endothelium (keratitis precipitates), that have a triangular arrangement in the lower central part of the cornea, indicate inflammation of the iris, ciliary body, or uvea. They are seen as white flecks as they reflect light, or black against the red reflex, when they obstruct the light from the ophthalmoscope. Such an approach will reduce the possibility of error, and give information for future comparison, in considering what progress the patient is making. The confusion that exists in the interpretation of the fundus picture arises from faulty deductions, rather than from the inability to observe. Some of the common mistakes are concerned with the following conditions:

Lens opacities.—Routinely, a +6.00 or +8.00 sphere should first be used in the peep-hole of the ophthalmoscope to examine for opacities not shown by the beam that has been passed through the cornea. In the lens they are always present from the fifth decade, and, when central, cause distortions of the fundus picture that may be interpreted as blurred disk margins, irregular vessels or refractive error. It is important that they be called *opacities*, as many patients have been needlessly alarmed by the mention of *cataract*. In the absence of diabetes or malnutrition it is not unusual to find good vision ten or fifteen years after nasal lens opacities have been recorded. Even the nuclear or central hardening of the lens, seen in patients from certain geographical areas, is not incompatible with years of good vision, with slowly increasing myopic corrections.

Vitreous opacities are present when inflammation has involved the interior of the globe. They may persist for long periods of time in patients with good vision. On the other hand their increase in number and size proves inflammatory progression, and the acuity of vision is decreased. Dust-like at times, they are seen moving downwards against the red reflex as the patient looks up. Masses of blood are dark or chocolate colour, and may obscure all fundus details. A dark mass towards the periphery, or central in uræmia, with darker vessels on its surface, suggests detachment of the retina, or, if solid, a new growth.

The disk borders.—As the patient looks to his front, and much effort is saved if he fixes a definite object, a reduction is made in the plus lens until the first vessel borders over the disk are clearly distinguishable. This lens is noted if whitish strands of connective tissue are seen, or if the nasal, upper, or lower border is blurred. This method of using a plus lens is an integral part of fundus examination by the "fog" method, which ensures the greatest relaxation of the observer's accommodation. The need for relaxation is greater in the young, as accommodation varies inversely with age, and refractive errors must not be mistaken for swelling.

Papillœdema, when present, may be measured in the following way if the pupil is dilated. The upper temporal vessels are observed above the foveola, with the highest plus lens that will clearly distinguish the borders, then the lower temporal vessels in the same manner. The average of these two readings is then subtracted from the number of the plus lens that focussed

the top vessel on the disc. The result shows the number of dioptres of the papilloedema. A high degree of swelling would be six dioptres, which is equivalent to 2 mm. of elevation. This finding, associated with intracranial tumour, demands a complete field examination as an aid in localizing the site of the lesion. It is also present in metabolic diseases and severe retinal arteriosclerosis.

Pallor of the disk is of no more or less importance than facial pallor. There is often a physiological difference in colour that shows a pinker nasal side of the disk, but 6/6 vision, with or without glasses, full fields, normal tension, and the ability of the patient to recognize 1 mm. blue, red and green, confirm a normal condition, no matter what the colour of the disk is or how deep the physiological excavation. Medullated nerve fibres appear white and always partly obscure the vessels that lie in the same layer of the retina.

Weaving vessels.—Tortuosity of the vessels is of no significance, as it may be found in children who are normal on repeated examination, but it is important to recognize vessels which weave in a corkscrew manner. As such a vessel is followed from the disk margin, it will be found necessary to change the lens in the peep-hole to keep the borders in clear view. This change in lens indicates the degree of the change in the level of the vessels, and shows the presence of œdema. A greyish discoloration may also be apparent accompanied by a rippled light reflex from the surface of the cloudy retina, as less light is reflected from the choroid and more from the surface of the retina. The stretching of the transverse fibres of the retina makes the surface uneven. This indicates increased intracranial pressure, metabolic disease, or retinal arteriosclerosis. Full non-pulsating veins will also be present on the disk.

The localization of hæmorrhages and exudates.—As the ophthalmoscope magnifies sixteen times, the normally transparent retina is observed at the range of the low-power microscope, and dilated capillaries will be visible, but should not be mistaken for fine flame-shaped hæmorrhages that occur in the fibro-vascular layer; the fibres impede extension transverse to their course, which gives them their typical appearance. Deeper hæmorrhages are punctate or round, as they occur in the nuclear layers. Choroidal exudate is deeper than the vessels, grey when seen early, and white with dark borders when of long standing, due to connective-tissue proliferation. Pigment granules from disintegration of the chromatophores are resistant to removal, and they accumulate in clumps following inflammation, at times surrounding and obscuring the veins. When coloboma (congenital gaps) and ruptures occur in the choroid, the presence of retina will be shown by retinal vessels, as they cross such white areas, the white reflex indicating sclera under the transparent retina.

Eye work is the most exacting of the specialties, and detailed measurements must be made that are not required in any other branch of medicine. These suggestions are made with the hope that reason, rather than memory, will be the guide in fundus diagnosis. The patient with failing sight is always alarmed, and the more faulty his vision, the more value he attaches to what remains. The general use of the ophthalmoscope should be the means of the discovery of ocular changes at a time when they will yield to treatment.

And, as every medical student knows, a miotic should be used after a mydriatic in people over forty, especially if the pupil is rather oval or sluggish. One drop of 2 per cent pilocarpine, or ½ per cent eserine solution, will counteract the homatropine and cocaine (aa 2 per cent) mydriatic.

Clinical and Laboratory Notes

PROLAPSE OF THE URETHRAL MUCOUS MEMBRANE

BY H. W. JOHNSTON

Toronto

Prolapse of the urethral mucosa is, as the term implies, a prolapse of the lining membrane of the urethra through the urinary meatus. Occasionally the condition is symptomless. On the other hand ulceration may set in from prolonged exposure, and resemble malignancy. When this occurs the condition is usually most painful. A biopsy of a piece of the suspicious tissue will settle the diagnosis. Strangulation of the prolapsed area is painful enough to make the patient consult her physician. The appearance is then not unlike that of thrombosed hæmorrhoids.

A prolapse of the urethral mucosa giving symptoms should be removed. The part is so very vascular and the mucosa shrinks up the urethral tube so rapidly when incised that any method designed to obviate these difficulties at operation is highly desirable.

It occurred to me that if the prolapsed area could be "run through" with two needles loaded with any suture material, the operative field would be clear of blood and the mucosa transfixed. This would prevent the mucous membrane from disappearing up the urethral canal when the prolapsed area was excised. The little operation illustrated by the figures does this.

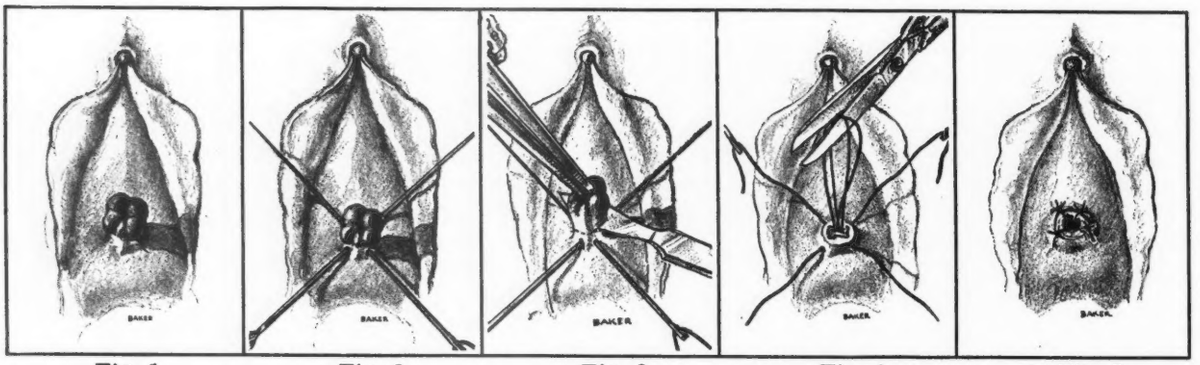

Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5

Fig. 1.—Shows the condition as it appeared at operation. **Fig. 2.**—Shows the prolapsed mucous membrane transfixed with two round needles. These had been previously threaded with black silk. Fine chromic gut may be used. This is bulky, however, and the swollen knots make catheterization, if necessary, both difficult and painful. **Fig. 3.**—The two needles crossed as shown make the urethra immovable, and the prolapsed area is now excised. **Fig. 4.**—The needles have been withdrawn. The two sutures traversing the canal are identified, drawn outwards, and divided. **Fig. 5.**—Four sutures are now available (see Fig. 4). These are tied. These four sutures are all that are necessary.

There are usually no dangers, difficulties, or complications with this operation. Every endeavour should be made to encourage the patient to void. Warm boracic compresses to the part make the convalescence less painful. The silk sutures come away of their own accord. If they do not, their removal is easy. The patient may be allowed up on the third day.

Editorials

WAR

THE die is cast. We are at war. It is needless to review the situation and ask, Why? We all know. We know also that the issues at stake are vastly more important than those in the last war. Hence an even more grim determination on our part to see it through.

The Canadian Medical Association has not been remiss in its duty. Months ago it took action to aid the Federal authorities in certain important directions and at all times has manifested its readiness to do its bit. It will continue its efforts. As illustrating its attitude we cite the following message which was sent on September first to the Right Honourable the Premier of Canada, the Honourable Minister of Defense and the Honourable Minister of Pensions and National Health:

> "In this time of crisis I am directed to say that the Canadian Medical Association with its Divisions and Branches across Canada stands ready to perform such services as may be regarded as properly coming within its scope. In the event of war the medical needs of the army and of the civilian population give rise to problems of medical selection in order that both needs may be met adequately. In the Motherland the British Medical Association has undertaken to act in an advisory capacity to the Government in the solution of these problems. Should the Government of Canada desire the Canadian Medical Association to act in a similar advisory capacity may I repeat that the Canadian Medical Association is ready and willing to do so."
>
> (Signed) T. C. ROUTLEY,
> *General Secretary,*
> *Canadian Medical Association.*

Most of us remember with pride the noble response made by the medical men of this and other countries during the last emergency, twenty-five years ago. The sacrifices made then were made willingly. We do not doubt that they will be made willingly again. It is a relief to know that we are now better prepared. The lessons of the last war have been well learned. There will be no attempts to fit square pegs into round holes. We are satisfied that the medical men will be assigned to the duties which each is best qualified to perform. This is reassuring. It will make for greater efficiency. Let us get on with the job.

A.G.N.

MEDICINE AND THE PRESENT EMERGENCY

A MANIFESTO ON MORAL RE-ARMAMENT

THE following message (equally applicable to Canadians, Ed.) from members of the British medical profession has been sent to American citizens at the World Assembly for Moral Re-Armament, Golden Gate Fair, San Francisco:

"In the continuing uncertainty of world affairs, medical practitioners in common with others are deeply concerned to restore the security essential to normal living. It is vital to create confidence during an emergency, but even more urgent to prevent catastrophe and to lay the foundation of a just and lasting peace.

"Science has made great advances, but without corresponding moral progress we risk losing even the benefits already achieved.

"Behind much disease, as behind world unrest, are fear, self-indulgence, jealousy and resentment. These are problems for which Medicine might provide a radical solution.

"It is still our privilege to enjoy unrivalled contact with the homes and people of the nation. Our immediate task is to teach men that health is not the mere absence of disease but includes a moral and spiritual foundation for life and the replacing of conflict and apathy with a purpose that claims the whole personality in the service of our fellows.

"A growing body of people in many countries is calling for this 'moral re-armament' to provide the discipline and the direction needed by both individual and nation. Our profession can give a lead to such a programme which is in accord with the highest ideals of our tradition. To achieve it we realize that the highest standards of honesty and unselfishness must be the touchstone of our professional and private lives. Only through insistence on these spiritual values will the resources of science be liberated and a new world built in which men can attain to their inherited capacity for physical, moral and spiritual development."

The message is signed by: Dr. G. C. Anderson, Sir Thomas Barlow, Lady Barrett, Sir Henry Brackenbury, Dr. H. Guy Dain, Mr. W. McAdam Eccles, Dr. Thomas Fraser, Professor John Hay, Lord Horder, Mr. Geoffrey Jefferson, Professor R. W. Johnstone, Professor John Kirk, Dr. Colin D. Lindsay, Sir Ewen Maclean, Dame Louise McIlroy, Sir J. Boyd Orr, Professor Leonard G. Parsons, Dr. Donald Paterson, Professor Lambert Rogers, Sir Humphry Rolleston, Mr. Cecil P. G. Wakeley, Sir Beckwith Whitehouse, Professor Samson Wright.

Other signatories: Dr. William Brown, Professor A. H. Burgess, Mr. Norman M. Dott, Mr. G. Gordon-Taylor, Dr. Noel G. Harris, Professor R. D. Lockhart, Professor J. W. McLeod.

—Reprinted from the *British Medical Journal.*

IN PRAISE OF THE OPHTHALMOSCOPE

THIS is a plea for the routine use of the ophthalmoscope in conducting physical examinations. Much, at times, may be gained by so doing. Occasions arise, too, when, for various reasons, eye-specialists are not available and the general man must fill the breach. In many cases, fortunately, he can do it. But he needs the dexterity that only comes with practice and the knowledge requisite to assess what he sees.

Medicine owes its high position today to the invention of instruments of precision and the development of methods of investigation. The parts played by the microscope, the thermometer, the stethoscope, the sphygmomanometer, the x-ray machine, and the electrocardiograph need not be stressed. The ophthalmoscope, only, seems to need a friend. It is true that the medical student is instructed in its use, but does he continue to use it after graduation in his daily work? We hope so.

The practice of ophthalmoscopy demands some patience, at least at first, some perseverance, and some skill. Doubtless, facility could be obtained by attendance at some eye clinic, but, short of this, much could be accomplished if the practitioner would make it a rule to use the ophthalmoscope routinely on every patient, if he would look upon this instrument as of equal importance with the thermometer and the stethoscope. Facility would come, and the correct interpretation of what is seen could be learned from some of the excellent books now on the market, which depict in colours and very beautifully the appearance of the fundus oculi in health and disease. The

ordinary practitioner, therefore, need not be an eye-specialist; he can do much for himself. Many valuable hints can be obtained from a paper entitled "The Internist and the Ophthalmoscope" by Dr. A. E. MacDonald, which appears in this issue (see p. 388). Often the ophthalmoscope can aid us in diagnosis, prognosis, and even in treatment. We suggest, therefore, that the physical examination of a patient be not regarded as complete until this instrument has been used. As an illustration of the value of an ophthalmoscopic examination we can cite from our own experience the case of a boy of sixteen years who came to the Out-Patient Clinic of the Montreal General Hospital with all the ordinary features of an acute generalized bronchitis. The ophthalmoscope revealed tubercles in the choroid and thus established at once the diagnosis and the prognosis.

Fortunately, the retinal pictures with which the general practitioner need make himself familiar are not many. The chief are, papillœdema, arteriosclerosis, hæmorrhage, vascular spasm and occlusion, and the various forms of retinitis. Perhaps the greatest difficulty would be met with in the case of retinitis, in which, of course, the etiology is rather varied (*e.g.*, arteriosclerosis; nephritis; diabetes.) A reference to any good textbook on ophthalmology would give the information necessary for a differential diagnosis. In most cases the appearance of the eye-grounds will at least give a clue to the possible cause or causes and the case can then be investigated along other lines. An obvious advantage is that ophthalmological examination will sometimes give early warning of the onset of serious systemic or local disease (*e.g.*, glaucoma).

The condition of the fundi will often, also, give a line as to prognosis and treatment. In the case of arteriosclerosis the changes in the retinal vessels, apart from indicating the existence of a generalized condition, such as arteriosclerosis, nephritis and diabetes, are relatively of little importance, unless extreme. Retinal exudates, on the contrary, indicate an advanced state of affairs. Retinal hæmorrhages are usually of little prognostic value, except in the case when they suddenly increase in number; this may indicate the speedy onset of a serious condition. There is a close relationship between sclerosis of the retinal arteries and sclerosis of the cerebral arteries. As a rule, when advanced disease of the retinal arteries is evident it may be inferred that the cerebral arteries are also affected. Yet, conversely, according to Moore,[1] the retinal vessels may be ophthalmologically intact in 30 per cent of cases of advanced disease of the cerebral vessels. When advanced sclerosis of the retinal arteries is present death supervenes as a rule before seven years, but exceptions occur. The usual cause is cerebral hæmorrhage, though it may be uræmia from renal involvement.

The weight of evidence indicates that the acute late toxæmia of pregnancy presents a hypertensive syndrome characterized by generalized spasm of the smaller arteries. The degree of systemic vascular spasm appears to parallel the height and duration of the blood pressure and the severity of the toxæmia. The changes found in the retinal vessels apparently are a measure of the degree of angiospasm throughout the body.[2] Retinal changes should be added to the accepted diagnostic triad, hypertension, albuminuria and œdema.[3] Ophthalmoscopic examinations, therefore, are of value in the diagnosis, prognosis, and management of the pregnant state. Mussey and Mundell[2] find that, in addition to hypertension and other signs, the presence and persistence of noticeable retinal vascular spasm is a guide to the management of late toxæmia. The presence of retinal changes of comparatively mild degree, or the absence of such changes may indicate that pregnancy may be allowed to continue without unduly jeopardizing the safety of mother and child. Schultz and O'Brien[3] agree that patients with normal fundi or angiospasm may be treated conservatively. The fundi should be examined frequently, and if organic changes appear in the retina the uterus should be emptied at once. When retinitis occurs in association with the pregnant state, the patient

1. MOORE, R. F.: Medical Ophthalmology, J. and A. Churchill, London, 1922, p. 61.
2. MUSSEY, R. D. AND MUNDELL, B. J.: Retinal examinations a guide in the management of the toxic hypertensive syndrome of pregnancy, *Am. J. Obst. & Gyn.*, 1939, **37:** 30.
3. SCHULTZ, J. F. AND O'BRIEN, C. S.: Retinal changes in hypertensive toxæmia of pregnancy, *Am. J. Ophthal.*, 1939, **21:** 767.

not being the subject of an antecedent chronic nephritis, the prognosis is much less grave than in the case of chronic nephritis in general (Moore, *lib. cit* p. 136). Not only may the patient live for many years but the retinitis may become completely resolved and the sight is often in large measure restored.

In the case of diabetic retinitis the prognosis is not nearly so grave as in renal retinitis, nor so grave as in arteriosclerotic retinitis (Moore). Naturally, we would expect this in view of the success of the treatment of this disease by insulin.

It has long been thought that patients with retinitis of renal origin seldom live more than two years, at least, if arteriosclerotic, puerperal and trench nephritis cases be excluded.

Vascular changes in the retina may indicate the trend of events even before the generalized vascular changes have become obtrusive, or, indeed, long before the patient complains of symptoms.

Optic atrophy may be an early sign in tabes dorsalis and in disseminated sclerosis. In the former case it may be of value in forecasting the course of events.

On all counts then, the ophthalmoscope has established its claim. A.G.N.

DE SENECTUTE

LIFE, death and immortality are subjects that have engaged the attention of mankind from time immemorial. The institution of religion can, in all probability, be traced to the desire of man to free himself from mundane shackles. Inextricably bound up with all this is old age, the last way-station on the road to death.

Old age, naturally, does not greatly worry the young, but it has concerned for centuries those of mature years, particularly those of a reflective and enquiring mind, the scholars and philosophers. Much has been written about it, speculation has been rife, but we cannot say that the subject has been exhausted; perhaps it never will be. We know what life is, at least so far as its manifestations are clear to us, though we cannot define it; we know better what death is—the cessation of the bodily functions and the gradual resolution of the body into its component elements. But many intricate considerations confront us. Why do animals die?, we may ask. If we take the unicellular organism we find that multiplication occurs by fission; one cell becomes two; there is no vestige of a corpse, and the process, barring accidents, can go on indefinitely. Therefore, the physical organism, as Weissmann first pointed out, is immortal. The case with the metazoa is different; they never are immortal. Why is this? We can get some inkling about it from a study of old age.

But again we must ask a question, What is old age? A question not easy to answer. Most of us, no doubt, remember the famous description of it in the first six verses of the twelfth chapter of Ecclesiastes (written probably towards the end of the third century, B.C.), allegorical, it is true, but intensely gripping. And the melancholy Jaques' "The sixth age shifts into the lean slipper'd pantaloon, with spectacles on nose, and pouch on side; his youthful hose, well sav'd, a world too wide for his shrunk shank; and his big manly voice, turning again towards childish treble, pipes and whistles in his sound. Last scene of all, that ends this strange eventful history, is second childishness and mere oblivion—sans teeth, sans eyes, sans taste, sans everything." A doleful picture, truly! But perhaps it is not so bad as all that! There are some who grow old graciously and gracefully and without excessive handicap.

Cultural experiments have shown that the individual cells of the human body also are potentially immortal but the conditions necessary for immortality cannot be realized when the cells are aggregated into masses forming part of a highly differentiated and specialized whole. As Sir Humphry Rolleston puts it[1], "The process of senescence must be regarded as the penalty for the high

1. ROLLESTON, SIR HUMPHRY: Aspects of Age, Life, and Disease, Kegan Paul, Trench, Trubner & Co., London, 1928.

degree of individuation entailed in the complicated mechanism of the higher animals and man."

We have dwelt so far on the physical aspects of old age. There is more to it than this, however. The mental processes of the aged deserve a word or two. Even in what we may call "normal old age" psychical changes are noticeable. Old people do not react to stimuli as quickly or as fully as do the young; the emotions are less active; there is a tendency to placidity; new ideas are not quickly born and are not quickly accepted. "Forgetfulness, first of names, and, much later, of recent events, and mental fatigue are other evidences of the change. With loss of memory comes the habit of repeating the same story or remark, of mislaying things, and of becoming careless about the external graces."[1] Since the mind and the soul are generally regarded as of the noblest elements in the human complex we are disposed to think of mental processes as of even more importance in the assessment of senescence than are physical defects. The mental outlook, indeed, may be a reliable index in this matter. William Lyon Phelps has said, "A person is not really old until his thoughts turn more to the past than to the present or future. That is a sure sign of a 'crack-up'." Incidentally, we may remark that the second childishness of the aged, as Jaques conceived it, is the very antithesis of the childishness of the child, with its superabundance of animal energy and its projection into the future.

The term "longevity" may be used in several connotations. For our purpose we may follow P. C. Mitchell, Secretary of the Zoological Society of London, who thinks it may be most conveniently used to denote "the specific potential longevity, that is to say, the duration of life that would be attained by normal members of a species if the conditions were most favourable". We all know that the expectation of life has increased greatly in recent years, but that is far from saying that the duration of life has been increased. We must still accept the Psalmist's estimate that "The days of our age are three score years and ten; and though men be so strong that they come to four score years, yet is their strength but labour and sorrow." Of course, there are exceptions. Some few reach one hundred or a very few more years, but this may be taken as the outside limit.

Are we to regard old age as a physiological or a pathological condition? This question cannot be answered categorically one way or the other. We think it is both. If the involution of cells and the atrophy of tissues be a criterion, we begin to die before we are born, and subsequent to birth the different organs have different spans of life. The individual tissues and organs have individual periods of growth and decline which are not synchronous. Some organs, like the heart and kidneys, are fully functional before birth; the thymus and the lymphadenoid system usually have involuted, at least to a notable degree, before the adult state of the body has been attained; the ovaries, testes, and mammæ may be atrophied and are certainly physiologically inactive before death of the body as a whole occurs. Truly, in the midst of life we are in death! In this, what may be termed a physiological process, lies an element of danger. The late J. G. Adami wrote:[2] "If these various organs in the performance of special function not only extract from the blood the materials necessary for their growth and nutrition but afford internal secretions to the same which are of definite service to other tissues and to the organism as a whole, it will be seen that the atrophy and disappearance of the same induces not only loss of special function but leaves the blood and remaining active tissues impoverished in one or other direction. Up to a certain point there may be an internal adaptation; it would seem there is always a tendency thereto, other tissues taking on certain of the functions of those that have disappeared. But, at the same time, this assumption of additional activity throws additional strain upon them and brings the still active cells nearer to the margin of their reserve force, nearer to the point at which these in turn become exhausted and undergo atrophy. The body, then, contains within itself some of the seeds of its own dissolution. The physiological gradually merges into the pathological."

Where are we to place arteriosclerosis?

2. ADAMI, J. G.: Principles of Pathology, Lea & Febiger, N.Y., 1910, 1: 991.

Is it physiological or pathological? It, or its secondary effects, are responsible for many deaths—through cerebral hæmorrhage, cerebral atrophy, coronary thrombosis, and renal sclerosis. Yet it is an almost constant concomitant of life, at least from the onset of early adult life. The late Oskar Klotz demonstrated deposits of lime in the wall of the aorta in a majority of persons at or about thirty-five years of age (autopsy finding). This seemed to be quite unconnected with the conditions from which these people died.

The early writers on old age, Terence, Cicero, Sanctorius, Roger Bacon, Arnald of Villanova, Francis Bacon, and others seem to have regarded it as a disease, and recommended various elixirs and drugs for it. It is, of course, obvious that certain diseases and disabilities, notably infection, may handi cap life and cause death. We need not dilate on this.

It is a common observation that some families are more prone to live long than are others. Here we must assume that they are endowed from birth with Grade A cells and tissues, in particular, with excellent arteries, and, possibly, with large organs which possess an extra amount of reserve force. Hence, how important it is to choose our grandparents, as Oliver Wendell Holmes put it whimsically. This inherited vitality comes up at once against a number of disintegrating forces, some intrinsic, some extrinsic. Disturbances of endocrine and hormone activity, or an upset in metabolic balance initiate changes which are inimical to life. We see here the transition of the physiological into the pathological. The experimental work of Carrel and Eberling[3] suggests that there is in old organisms a substance, produced in the ageing cells, which exerts a deleterious action on the life and reproductive power of the tissue cells.

Extrinsic forces, too, notably, climate, housing, diet, dirt, disease, and accident, all play their part. Heredity and environment are the factors to be reckoned with.

A.G.N.

3. CARREL, A. AND EBERLING, A. H.: *J. Exper. Med.*, 1921, **34**: 599.

Editorial Comments

Municipal Responsibility for Typhoid Epidemics

In the autumn of 1937 an epidemic of typhoid fever broke out in the town of Croydon, Surrey, causing 341 cases, with 43 deaths.* The investigation into the disaster resulted in findings which attached a great deal of blame to the county borough authority. Consequently, several of those who suffered in the epidemic made claims against the corporation, and one of these was selected as a test case by which to decide all the other claims.

In the case chosen the patient was a girl of 16, and both she and her father sued the council for damages sustained through her illness. The father's claim was for special damages for the girl's medical expenses, and she herself claimed for pain, suffering and inconvenience. At the original investigation a large body of evidence had been collected, and substantially the same facts were established in the hearing of the case. The corporation freely admitted all this evidence. Their attitude in this respect drew praise from the judge, who found much to commend in their not adopting a defensive and obstructive policy. From the moment that the outbreak had begun the officers of the corporation made their investigations with complete disregard for the consequences to those responsible. The opposing counsel willingly agreed that in the report of the medical officer of health candour "jumped out of every line" to such an extent as to make him regret having to make charges against persons of that type.

The evidence definitely established that the corporation had been guilty of negligence with regard to the water supply. The officers were men well qualified for their task, but there was an imperfect system of control. For example, there had been no medical examination of the workmen engaged in work on the sources of the water supply; one of these later was shown to be a typhoid carrier. Again, whilst a chlorinating plant had been installed, the extent to which this precaution was used was "haphazard, ill-considered and inadequate". At the time that the men were working on the ground, and precautions should have been most strict, chlorination had been omitted. It had been urged in defence that the policy of chlorination was under some criticism, but the judge thought it should have been recognized that the establishment of a settled policy on such a matter was of paramount importance. The lawyer for the defence contended that the risk of contamination

* See the *Brit. M. J.*, December 17, 1938, p. 1286.

had been so remote that no one was to blame for not foreseeing it. He thought that this was a case of being wise after the event. But the learned judge felt that the evidence showed conclusively that the epidemic was caused either by an infection brought in by the workman carrier, or by some other unidentified and probably transitory condition in the sources of the water supply. To say, as had been suggested, that perhaps the excrement of some passerby had been washed down into the gathering ground, was a possibility; but it could not compare in likelihood with the other well established certainty of one of the workmen being a carrier, and all the recognized potentialities of that fact.

The outcome of the action was that the patient was awarded £100 general damages, and the father an agreed sum of special damages. The corporation then announced that it would not appeal the decision, and that it would deal with the 230 or so other claims against is as soon as possible. The Finance Committee was anxious that proper compensation should be paid in other cases where the issues were the same as those of the test action. To cover this expenditure it was proposed to raise a loan over a period of twenty years.

The decision in this case is likely to have considerable influence in future similar epidemics. Typhoid fever has now been brought under control so completely that any outbreak can usually be definitely traced and responsibility apportioned. Where the water supply is at fault and is a municipal responsibility it is hard to see how compensation for resultant typhoid can be avoided. There have been instances in Canada in which municipalities have been sued for damages arising from typhoid fever, but although in one case the suit was won by the patient, and in another it was won in the lower court and the decision reversed on appeal, there has been no example of mass restitution such as has been carried out in Croydon. H.E.M.

Special Article

STANDARDS IN FOOD AND NUTRITION*

BY E. P. CATHCART, C.B.E., M.D., F.R.S.

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The problem of good nutrition is undoubtedly one of the most interesting and at the same time one of the most obscure which confronts physiologists and clinicians alike. I have been working at the problem, from many aspects, for the last thirty years, and each year its magnitude and its protean nature become more impressive. It is too often forgotten that the science of nutrition is still very young. Further, too much of the material published deals with the alimentation of the lower animals and too much, even of this work, has been carried out on the young of the various species. There is a natural longing for a simple explanation of the complex metabolic processes which lie behind the clinical state called good nutrition. There is, needless to say, no simple explanation. Man is not a simple physico-chemical machine but a living sentient being, built to a very intricate pattern, whose very moods can modify his apparent state of fitness and distort our judgment regarding his state of nutrition. Moreover, we all realize that the metabolic processes and responses are not alike in all men. In what I have to say I am not attempting the fashionable process of "debunking", but merely trying to give you some insight into a few of the real difficulties, as I see them, particularly those associated with the quantitative aspect of the necessary food intake.

The food, as is very obvious, must be adequate both in quantity and quality if it is to perform its function as one of the factors, indeed, under normal conditions, the most important factor in good nutrition. It must be emphasized from the outset that what we call the state of good nutrition is not the same as good alimentation, that is, the provision of adequate food. Each of you recognizes perfectly well, and I have no need here to stress the fact, that superalimentation may indeed lead to a state of what you would have no hesitation about calling mal-nutrition. There is more than a grain of truth in the common statement that more people ultimately die from the effects of over-eating than from under-eating. The mere acquirement of weight is not a condition to be aimed at.

The state of good nutrition, or, for that part, of mal-nutrition, means far more than the result of the provision of an adequate or an inadequate diet. Indeed, so far as mal-nutri-

* A paper read at the Seventieth Annual Meeting of the Canadian Medical Association, Montreal, on June 23, 1939.

tion goes, Emerson in his book on "Nutrition and Growth in Children", in citing the causal factors in the genesis of mal-nutrition in children in the order of their importance, puts "improper diet and faulty food habits" in the fourth place. The fundamental difficulty, which in the end confronts everyone who enters into the discussion of the state of nutrition, is that there is no known objective standard by which the state can be measured. Great stress has been laid by some workers on somatometric measures, like height and weight and the ratio of these two or other additional measurements, but, in the last resort, they must be considered poor indexes. Far too much stress, in my opinion, has been laid on the average value of the two factors of height and weight. Height is an hereditary factor. You may it is true speed up the increase in height where, for one reason or another, *e.g.*, an inadequate supply of proper food, growth has been retarded, by the provision of an adequate diet. But although growth in childhood may be accelerated the ultimate height reached by the average individual will be, in the main, that predetermined by his or her heredity. In the poultry world you may feed bantam and leghorn chicks on the choicest of diets, you may raise a race of perfect bantams but never, in your wildest dreams, do you expect the bantams to grow to the size of leghorns. There would also seem to be another complication that even normal growth, granted its annual seasonal variation, is not equal from year to year. Palmer's work suggests there may be good and bad growing years.

As regards weight, owing to the fact that it may be due either to inert fat, not very active (metabolically), bone, or very active (metabolically) muscle, it is difficult to reach any final conclusion as to its real value. I think most clinicians would prefer, from a prognostic point of view, a thin wiry child rather than a heavy obese child as a patient suffering, let us say, from pneumonia.

The other methods adopted for the assessment of the state of nutrition are for the most part subjective; the gloss of the hair, the bloom of the skin, the alertness of the eye, the spring in the posture, the general appearance of aliveness. Taken as a whole, an excellent picture, but difficult to assess, and still more difficult to retain the mental picture as a personal standard. In other words the skilled physician assesses the state of nutrition in more or less an intuitive fashion. It is the whole picture he judges by and not a meticulous assessment of parts. It is on account of this very personal judgment that so many difficulties arise in the assessment of the state of nutrition of groups of school children.

I have already stated that I thought too much of the research work had been carried out on the lower animals, more particularly on rats and mice. Dietary experiments on rodents have their value. The use of such small animals permits of experiments on a scale and of a duration which would be quite impossible if larger and more slowly developing animals were employed. Further, they permit of many more combinations and permutations of foodstuffs being tried out within a relatively limited period. They are essential, too, for the study of growth. But despite all the advantages which accrue from their use the very fact that the material is cheap and the feeding for the most part easy, renders them dangerous. H. H. Mitchell, to my mind, has put his finger on a real danger, a danger which does not seem to have been envisaged by many of the workers in the field of nutrition. He has written "It is a good thing that our complacency in the infallibility of a sort of Jeffersonian doctrine that all animals are created equal is being disturbed. A study of rodent nutrition is profitable in an understanding of mammalian nutrition only as its findings are periodically checked with the other mammalian species." How many research workers who use rodents ever check their results by experiments on another species? Moreover, the very fact that so much of the work has been done not merely on the rodent but on the rapidly growing rodent is in itself dangerous, due to the temptation to assume that the facts elicited during the period of metabolic activity are applicable to the adult animal and too often by inference to the human subject. I again quote Mitchell "We know little about the nutrient requirements of maturity and the physiological efficiency of the adult organism in its assimilation of food. What we do not know concerning adult nutrition we too readily infer from the established facts of adolescence, and I believe our inferences are liable to give a distorted picture of reality."

One speaks so glibly of good or bad nutrition as if all we were concerned with was the process of supplying a sufficiency of food which would yield all the essential materials for the upbuilding of the various tissues and organs on some, admittedly ill determined, physico-chemical basis. The part played by the nervous system, the so-called trophic nerves, and the mind, the *psyche*, the spirit, call it what you will, is forgotten or, more likely, ignored. Clinicians of course recognize that, despite the provision of adequate food, atrophy of the muscles still occurs in anterior poliomyelitis, that in splinted injured limbs—particularly noticeable in the case of injuries to the knee joint—atrophy of the muscles is a constant sequel. And in those remarkable neuroses like anorexia nervosa the wasting may be regarded as phenomenal. What is the exact chain of events in all these apparently different types of atrophy? What, further, is the metabolic differentiation between the tissues of certain individuals who will not put on weight despite over-alimentation and those who despite infinite care in dieting put on weight? No. The interpretation of the metabolic problem called nutrition is still far from clear. We can ask endless questions but few conclusive answers are forthcoming.

When we turn to the more specific problems of the supply of food the differentiation into the two aspects of quantity and quality are reasonably clear. It is generally assumed, by the younger generation at least, that the quantity aspect is simple and beyond doubt. But even here, although it is very obvious that the income and expenditure of life's ledger must balance, there is still room for considerable discussion. For example, it is assumed, on the basis of an engineering formula, that the human body is about 20 to 25 per cent efficient, *e.g.*, if, say, 200 calories of work are done to make good this loss 800 to 1,000 calories in the form of food must be ingested. But the efficiency of conversion or utilization has little or nothing to do with the effectiveness of the body as a machine, or rather as a producer of work. The determination by means of the engineering formula may show that the individual is still about 20 per cent efficient and yet the individual may be on the verge of a complete breakdown as a producer of work. As regards the total amount of energy required to make good the daily losses I think it is probably correct to affirm that 3,000 calories gross would suffice today to provide a sufficiency of energy for the average man. The fact, however, must not be lost sight of that there is a definite relation between the quality of the diet and the availability of its contained energy. The better the quality of the diet the more readily available, on the whole, is the energy it contains.

The great bulk of the material supplied as food is utilized as the source of this very necessary energy, the rest for the running and the repair of the body. The required energy is for the most part derived from carbohydrate and fat. Little need be said about the carbohydrate supply as it acts as the "elastic reserve" in all normal dietaries. No standard intake has ever or is ever likely to be laid down in normal times. When arduous work has to be carried out the preceding diet must provide an ample supply of carbohydrate in order to fill up the glycogen stores. Krogh and his co-workers have stated, contrary to general belief, that "when the absolute maximum of work is to be attained—*e.g.*, in sporting contests—about two days' rest is required to secure a complete filling up of the glycogen stores, and it appears that this cannot be done by taking large amounts of carbohydrate just prior to the work."

It is true that most of the fat in a diet may be replaced by carbohydrate, but not carbohydrate by fat. Yet both substances are compounds of carbon, hydrogen and oxygen and both, under normal conditions, have the same end-products of combustion in the body, *viz.*, carbon dioxide and water. Moreover, in the absence of carbohydrate the utilization of fat in the organism is most defective. Although this statement is generally true it cannot be absolutely true because, as Heimbecker showed in his study of Eskimo metabolism, despite the fact that the consumption of carbohydrate, for most of the year at least, is negligible and their fat intake high these people do not develop the acidosis which would normally be expected. Even when starved, contrary to ordinary expectation, the acidosis which results is slight, although the evidence from the respiratory quotient did not indicate any increase of carbohydrate utilization. Folin and Denis noted too that in cases of ordinary obesity less carbohydrate is required than with the normal subject to metabolize their fat. Have we to assume the possibility of there being two biological mechanisms for the combustion of fat? That the diet

consumed by the Eskimo will suffice in more congenial latitudes is proved by the dietary experiment on Stefanson. In this experiment it should be noted that where the diet is limited to meat the meat eaten must be relatively rich in fat. If protein yields the carbohydrate, as it can yield carbohydrate, why did the respiratory quotient in Heimbecker's Eskimo during their starvation periods remain so low? Fat possesses qualities as a source of energy which carbohydrates do not possess. Possibly due to the slow energy liberation from fat there is a definite demand for it when prolonged hard work has to be performed. Many of the athletic training diets are very rich in fat. Further, it has been found that as the income available for expenditure on food rises the consumption of fat increases. This is perhaps understandable in the colder regions but why does the same phenomenon occur in the diets of the Bengali in India? Fat unquestionably subserves other functions than the supply of energy carriage of the fat-soluble vitamins, the need of unsaturated fatty acids for growth. But it is difficult to lay down any definite quantitative standard. The Technical Commission of the League of Nations (T.C.L.N.) most tentatively suggested that from 80 to 125 grams per diem would suffice.

When we turn to the consideration of the third energy-giving substance the metabolism of fat and carbohydrate seems simplicity itself. It is true that protein can yield energy but, generally speaking, it is not consumed for this purpose but for the supply of nitrogen and sulphur and, to a certain extent, of phosphorus. I do not propose to enter into a discussion of the need for specific amino acids but to consider protein as a unit. The first question to be asked is How much protein is required? Voit, the father of modern metabolic studies, laid it down that the average man required 118 grams per diem, and Atwater increased the figure to 125 grams. There was no very serious criticism of these figures until Chittenden startled the scientific workers engaged in this field of research by stating that, in his opinion, about 40 grams were ample. The T.C.L.N. agreed that the average needs will be covered by an allowance of 1 gram per kilo of body weight. v. Furth, in my opinion put the problem into correct perspective when he summarized the whole question of protein needs by stating that three minima or levels must be recognized; (1) the endogenous, ranging from 17 to 25 grams per day, which is merely of scientific interest; (2) the physiological, about 45 to 60 grams, where nitrogenous equilibrium may be attained if there be an ample supply of carbohydrate and fat; and (3) the hygienic or practical minimum, 75 to 95 grams of protein per diem, which would suffice to maintain a 70 kilo man at moderate work in good health and condition. v. Furth was careful to point out that these values must not be regarded as physical constants but merely as physiological approximations. Many factors, such as the calorie value of the diet, the work done, the nature of the protein used, the carbohydrate content of the diet, the fat content of the body, the mineral content of the diet are known to influence these levels.

As an example of the effect of the composition of the diet on the metabolism of protein I should like to draw your attention to some work by Cuthbertson and Munro. It is of course common knowledge that, using an ordinary mixed adequate diet, given the proper experimental conditions, it is perfectly easy to get a subject into a state of nitrogenous equilibrium, *i.e.*, have the nitrogen intake and output balance. Cuthbertson and Munro found, however, that using the same diet, but consumed so that the meals were divided up into two composed of protein and most of the fat, and the other two composed of the remainder of the fat and the carbohydrate, not only is there an increased loss of nitrogen from the body but during the period of the experiment there is a steady decline in body weight. Admittedly, the periods of experiment were of short duration, and it is of course possible that the organism, if given time, would have adjusted itself to this particular type of dieting. Does the protein-sparing property of carbohydrate alone account for this curious disturbance of the nitrogen balance when the protein in the diet is separated in time from the carbohydrate? If the explanation be the absence of protein-sparing carbohydrate why do the Eskimo with their minute intake of carbohydrate not die out?

In view of all these facts it is difficult to lay down a permanently fixed standard. Personally, I believe that we are safe with an intake of approximately 1 gram per kilo of body weight, or, perhaps, stated better when protein calories form from 10 to 12 per cent of the total calories, of, say, 3,000 calories.

But we must also examine the more modern question as to the best form in which to give the protein. It would seem to be obvious that, physiologically, the most economical protein to give would be one in which the amino acid make-up approximated most closely to the make-up of the tissue and organ proteins. Such proteins have, rather unfortunately, been called first-class proteins; unfortunately, because the name suggests that there is a sharp line of delimitation from some other group or groups of proteins. There is no such sharp limit. These proteins have sometimes rather loosely been called proteins of high biological value. It is true that they belong to this class but it does not seem to be recognized, by some of those who use the term, that the value is not as static as a physical constant. The fact is that the biological value varies inversely with the concentration of protein in the diet and it may also vary with the age of the animal. It is not only that first-class proteins, such as those obtained, for example, from meat, milk products and eggs, are good in themselves, but when combined with less valuable proteins obtained from, for instance, cereals they exert a supplementary action, so that the biological value of the combination of the proteins may have actually a higher value than the first-class protein component itself. This enhancement is one of the definite advantages which accrue from the use of a good mixed diet.

There has been considerable debate as to the amount of first-class protein which should be present in the diet. So far as I know there is no real evidence which would support any fixed amount but there seems to be a general consensus that it should not form less than one-third of the total protein. This protein may be most readily derived from meat or milk or cheese. This raises the question as to the place of meat in the diet. Is it essential that meat should find a place? It is quite true that the majority of men engaged in hard labour demand meat in their diets. It is equally true that the great majority of the athletic training diets are rich in meat. Thus, at the Olympic Games in Berlin an investigation was made into the dietaries of more than 4,700 athletes, drawn from over 40 different races, when it was found that the vast majority were large consumers of protein, usually in the form of meat. There is, so far as I know, no good evidence to show that the intake of meat protein is essential for the performance of hard muscular work. One has only to consider the athletic feats performed by vegetarians and lacto-vegetarians. Why then this persistent demand for meat? Is it that meat is demanded for its specific stimulating properties, or on account of its specific dynamic action, or is it merely that the flavour and the tastiness of meat aids in the consumption of the increased, rather tasteless, carbohydrate and fat required for the production of energy.

The greatest stress as regards protein intake has been laid on the fear of its being too low. There is quite good evidence, indirect, perhaps, in the case of human beings but direct in the case of rapidly growing animals, that too much protein in the diet may be deleterious. Thus it has been shown that the growth-promoting properties improve by increasing the percentage of protein in the diet from 4 to 16, whereas it was equally clear that when the percentage exceeds 30 there is a definite decrease in growth promotion.

Emphasis has also been laid on the special protein requirements of childhood. The T.C.L.N. laid down certain values which seem to be on the high side. Thus a child of 10, weighing, let us say, 30 kilos, would require according to their standard a daily allowance of 75 grams, as much as an adult engaged in moderate work. Terroine, one of the most active workers today in the field of metabolism, combats this allowance as being absurdly high. He maintains that the needs of a child of this size would be satisfied by an intake of between 10 and 11 grams per diem. Terroine, it may be added, also holds that the allowance made by the Commission for a pregnant woman is overstated. He holds, and his evidence in support seems to be sound, that the average pregnant woman's requirements for protein are fully satisfied by an allowance of 1 gram per kilo of body weight per diem.

When we turn to the consideration of the non-energy giving principles, water, mineral salts, and vitamins it may be stated that although we know a considerable amount about their qualitative actions our knowledge concerning their quantitative aspects is distinctly lacking. Water, in view of the fact that under normal conditions it is rarely unobtainable, we may in the present address ignore, despite its absolute importance for the organism. We all realize that a man may live for several, indeed

many, weeks without food but death follows a few days' deprivation of water.

As regards the mineral salts, although analyses show that practically the majority of the elements may be found in the human body, our knowledge regarding either the function or indeed the need for the bulk of these is simply non-existent. One of the fundamental difficulties about the study of the mineral substances is the long time that must elapse in metabolic experiments before equilibrium is reached. In the majority of cases it requires many weeks, a condition which has not been fulfilled in the great bulk of the experimental work on record, before one can be sure that true equilibrium has been attained. Yet standard intakes have been laid down for several of them. The greatest debate has centred in one element in particular —calcium. There is no doubt about the importance of calcium and from many angles we know a good deal about the part it plays in the organism, but there is still much doubt, in some minds at least, about the quantitative requirements. It is true that Sherman has put forward a standard based on 97 experiments collected from the general literature, but, among these experiments, the actual level at which equilibrium was said to be reached varied from 0.27 to 0.82 gram. On the basis of these figures he found that the average daily intake (corrected for differences in body-weight of the subjects) was 0.45 gram and to this value he added an arbitrary factor of safety of 50 per cent. As Wishart remarks, "it is too frequently forgotten. . . that Sherman's maintenance figure of 0.45 gram is just an average and its later restatement as 0.45 ± 0.008 gives it, to the unwary, a spurious semblance of accuracy."

Sherman justified his factor of safety by a comparison with protein standards where there is definite evidence that a physiological minimum, well below the practical or hygienic minimum, exists. He seems to disregard the fact that there can be no real comparison between protein and calcium. There are many types of protein and little or no capacity for storage in the body, whereas, so far as is known, there is but one type of calcium and an enormous capacity for storage. One, in general, may consider protein a dynamic and calcium a static component in metabolism. In any case, so far as I know, none of the experiments on which the Sherman figure is founded had pre-periods of the duration which the work of Berg would go to show are essential before reliable basic data can be obtained. Further, in all these experiments it has been assumed that the fæcal excretion of calcium represents, in the main at least, calcium which has been metabolized, has been taken up into the tissues and later passed back into the gut. When modern experiments, such as those of Walsh and Ivy and of Taylor and Fine, threw doubts on the validity of anything but a trace of excretion into the small intestine it was suggested that the large intesine was the seat of excretion. But here again the evidence of other modern workers like Stewart and Percival, Taylor and Fine, Nicolaysen, Welch, Wakefield and Adams, Johnson, and Wright, Florey and Jennings shows that the amount of calcium excreted into the large intestine is very small. Further the injection of calcium salts into the blood stream is usually followed by an increase in the urinary output but little or no increase in the fæcal.

If the Sherman standard be considered as *the* standard it is proper to ask how it stands when confronted with what people actually ingest. It is notorious that among many Eastern peoples the normal ingestion of calcium falls far below the Sherman standard, without, in many instances, any manifest ill effect. Thus in a recent paper D. C. Wilson, who has made a study of the diets of Northern India, specifically states that "everyone of the average calcium intakes (730 persons) appears to be inadequate" by the Sherman standard. When 6,000 children of the same peoples were examined it was found that "the amount of abnormality is generally slight, there being only one child, out of the total 6,000, assessed as bad." "There condition of the teeth is generally good." If it be considered that a comparison with Eastern races is not fair or permissible, as their diet, in general, is so different from that of the Western races, we can turn to the recent report of the Advisory Committee on Nutrition in Australia, a land whose inhabitants cannot be said to be physically degenerate. In this report it is stated that if the Sherman standard be adopted then only some 3 per cent of the several hundred Australian diets examined reach this standard. The whole problem of the determination of a standard intake of calcium is further complicated by the fact that calcium is so interlinked with that of the elements magnesium and phosphorus as well as with

vitamin D. One must agree with Durig that our present knowledge "is far too limited to allow us to lay down standards relating either to calcium needs or to the means of their satisfaction." It is clear however that one of the finest sources of calcium is unquestionably milk.

The question of both the qualitative and quantitative aspects of the vitamin requirements is even more complicated than that of the mineral salts, as our fundamental facts and our methods of detection and assay are on a less secure foundation. We know of course that certain vitamins are required, A, the B complex, C, D (probably a complex), and possibly others, but how much, *under ordinary conditions of living*, is required of each of these vitamins is not yet firmly established. And yet, if they be so essential, how is it that even in marked cases of anorexia nervosa it is very rare that any evidence is shown of vitamin deficiency or, for that part, of lack of minerals? Another of the quite unnecessary difficulties which confront the scientific clinician is the superfluity of standards, quite apart from the fact that the assays, irrespective of standard, are so variable. The T.C.L.N. recognized that these difficulties existed. They stated in their last report: "the existing data on vitamin requirements are difficult to apply and also to establish and all figures contained in this section (of the report) are to be regarded as approximate and provisional." Personally, I think it is one of the major misfortunes of modern dietetic work that the investigation of the whole vitamin problem has not been confined to a few laboratories directed by men with a sound biological training. Rats and mice are easy to play with; correct deductions as to their health and state of well-being are difficult to draw.

Diets do not require to be elaborate in order to supply the materials which are regarded as requisite today. The elaboration of diets is, in the main, the result of the dictates of the palate rather than of the satisfaction of real needs. Modern physiology might not approve of the stark simplicity of the meal in the Rubaiyat "a loaf of bread, a jug of wine and Thou", but if the loaf were made of whole meal, the jug of wine replaced by a jug of milk, with a salad or a dish of fruit added, irrespective of the attractiveness of the Thou, most, if not all, of the physiological requirements would be satisfied.

Durig, in a remarkable and interesting discussion of the propriety of setting up international standards of food intake maintains, and I think rightly, that popular nutrition is not amenable to any international standardization, and that it will never conform or adjust itself to such international regulation so long as a free choice of diet is possible. As he says "it is therefore to be expected that the practical application of dietary standards to popular nutrition will have only a very limited effect, because people who are free to choose their diet will not bother about such standards; those whose diet is prescribed for them, or who cannot afford a proper diet, cannot bother about them; and even specialists and professors of dietetics cannot, and in any case will not, construct their own daily diet according to standards."

I do not wish to convey the impression that I object to standards or think them useless. This would not be true. What I have been trying to make clear to you is that many of the so-called standards, so much quoted today, are open to suspicion. And I do object most strenuously to the scare deductions which are drawn from these suspect standards. Many of these deductions and the statements made when confronted with the daily facts of existence are manifestly untrue. It is perfectly easy to seize upon someone's high requirements for this or that material and then, using this value as the minimum, to assert that masses of the population are cursed with mal-nutrition. I do not for a moment suggest that we are a perfect people, and I do not mean to infer for a moment that there is nothing more to be done in the study of food and nutrition and the application of this work to the every-day needs of the people, but I do suggest that we should not, in determining whether a community or a people are in a state of gross mal-nutrition, rely too exclusively on the so-called laboratory standards now available, more especially as the state of nutrition is not wholly dependent on the ingestion of food.

Medical Economics

The Wage Rate for Physicians Less than for Skilled Labour

An instance wherein a public assistance agency's hourly wage rate allowance is less for physicians than for several classifications of skilled labourers is cited by an editorial in *The Journal of the American Medical Association* for August 26th. The editorial says:

"Recent issues of Philadelphia newspapers published the prevailing wage rates adopted by the Philadelphia County Assistance Board for occupations of various types. The highest rate given appears to be that for a bricklayer who is a skilled foreman. To him the sum of $1.79 an hour is permitted. Next comes an iron and steel worker, who gets $1.65 an hour, and after that an ordinary bricklayer, who gets $1.62 an hour. There are still some occupations which are preferable to that of physician, including that of marble setter and polisher at $1.60 an hour and plasterer at $1.55 an hour.

"In the next group come the doctors. Among those who are allowed $1.51 an hour are found the air compressor operator, the dredge operator, the power shovel operator, the pump operator, the roller operator, the architect (registered or certified), the statistician (graduate or certified), the lawyer and the physician. There must be some explanation for this classification but it is not easily apparent. The study of such lists provides much interesting information. For example, a tree pruner, who might be considered in the professional class, gets only 59c an hour; a sign painter, whose work is in the nature of artistry, $1.29 an hour; a secretary-stenographer, 70c an hour, and a translator $1.00 an hour. The lowest rate paid to anybody is 50c an hour. A machinist's helper gets 59c an hour but a marble setter's helper gets $1.00 an hour and a riprapper gets 59c an hour. A concrete spreader gets 59c an hour and an asphalt spreader gets 65c an hour. Evidently it depends on what you are spreading around."

Cooperation is Required to Solve Medical Service Problems

A satisfactory solution to the problem of medical service requires the development of cooperative plans between the medical profession and official health agencies.

"While public health is preventive and the practice of medicine by the general practitioner as well as by many of the specialists is of necessity both preventive and curative, there is no reason why the practice of private medicine and public health should not go forward without divergence of thought and opinion and, through proper coordination of efforts, develop and render more and better service to all concerned."

Changes in economic conditions in the country during the past several years have presented new problems both to the medical profession and to public health departments. "There have been added responsibilities of the health departments in relation to certain diseases and crippling conditions. It is an indisputable fact that many of these diseases or conditions are of long duration, and many of those suffering from such diseases or conditions are unable to provide for themselves needed medical care and hospitalization.

"With the knowledge of the public concerning such diseases and conditions and with the death rates of certain diseases steadily increasing, it has been necessary for the functions of the health departments to be expanded in many instances in an effort to meet this need. Certain diseases, such as cancer and heart disease, have steadily increased as a cause of death, and the health departments are receiving requests not only to furnish information and education which would lead to early diagnosis but even to provide facilities for treatment and care in cooperation with the medical profession.

"These added functions and responsibilities of health departments can properly and successfully be carried out in the many fields which must be undertaken only with the coordination and correlation of the activities of those engaged in preventive medicine, industrial medicine and public health. The physician will continue to perform his duty to humanity as far as he is able to do so, but the care of the indigent sick is a responsibility which the physician cannot carry alone, and it is not his place to assume this responsibility without just compensation for his services."—I. C. Riggin, "The Expansion of Functions and Responsibilities of Health Departments," *J. Am. M. Ass.*, 1939, **113:** 275.

Voluntary Health Insurance

Voluntary health insurance was the subject of extensive discussion at the 17th annual Rural and Industrial Conference held at St. Francis Xavier University, Antigonish. The problem of health insurance is, according to the belief of one speaker, of such extent and importance as to be effectively handled only when there is national as well as local action. Preventive work now being done through public health services, and the policy of tax-supported care for diseases dangerous to public health or especially costly to treat, should be continued and extended. But centralization of complete control of all sickness is neither necessary nor advisable. The formation of volunteer health groups should be encouraged for self-supporting families.

Another speaker was quoted as stating, "We feel that state control goes too far and exerts an undesirable influence on the medical profession. As enlightened community groups we can achieve what is promised under State Control". Dr. J. F. Bates, of Glace Bay, was present and spoke on the profession's point of view, cautioning the adoption of undeveloped plans. He thought the best agencies for bringing about health schemes in rural districts were the co-operative organizations.

Association Notes

The Annual Meeting of the British Medical Association, Aberdeen, 1939

BY FRANK G. PEDLEY

Official Delegate of the Canadian Medical Association

"Ae mile o' Don's worth twa o' Dee
Except it be for fish and tree"

The Don's at the north, the Dee at the south, and between them lies the City of Aberdeen, the "City of Bon Accord". From Plymouth, last year's convention city, to Aberdeen is a far cry for Britishers, but distance did not prevent a large attendance at the 107th annual meeting. I was told that 1,200 had registered. With wives and others the accommodation at the hotels was strained. One hundred and seven years of experience have undoubtedly taught the British Medical Association what their members want at a convention. Evidently the British medico likes to dilute his scientific deliberations liberally with less serious things. The Aberdeen Committee fell in right heartily with this idea and provided an amazing variety of entertainment. Trips to points of historical interest, visits to hospitals, sherry parties, garden parties, and dances made up the program of entertainment from which the delegate could choose as his inclination ran. The Ladies' Committee was particularly active.

Aberdeen is a city of granite, and because the Aberdeen granite possesses to a superlative degree the quality of keeping clean, buildings which are old look new and the whole city has a new appearance. Educationally, Aberdeen has long occupied a leading position in the British Isles. Centuries ago Pope Alexander VI authorized the establishment of a university for that north-eastern portion of Scotland "cut off from the rest of the Kingdom by firths and very lofty mountains, where dwell rude and ignorant men, almost uncivilized". This university was King's College, and we are to know that the crown which is seen at the top of the stately Crown Tower in King's College is not symbolical of a regal charter but of that of the Holy Roman Empire.

King's College was founded in 1495 but not many years elapsed before religious disputes consequent on the Reformation produced a rift which ultimately led to the foundation of Marischal College in 1595. For nearly 300 years thereafter the citizens of Aberdeen could boast or bemoan the presence of two complete universities. The friction and rivalry which inevitably arose was constantly a matter of discussion and occasionally of conference, but it was not until 1860 that the two universities were made one by Act of Parliament and Aberdeen University was created, to become a leading centre of higher education in the Empire.

The union of these two ancient universities did not cure the geographical difficulty; King's still stands in old Aberdeen, Marischal, in New Aberdeen. Within the last year or so the concentration of Aberdeen's voluntary hospital services on a new site has attracted the Medical School away from Marischal College, and, to the regret of many an Aberdonian, the University as it stands today consists of a series of buildings sprawled over the city. This may cause some distress locally, but if one can judge from results the University in filling its purpose and turning out graduates of whom the citizens may well be proud.

One is tempted to write at length of other things in Aberdeen; of the municipal hospital now under the control of the Health Department and used by the Medical School as a teaching unit; of the unique organization of health services which cover not only the City of Aberdeen but the County of Aberdeen and the County of Kincardine; of the Aberdeen Medico-Chirurgical Society, founded in 1789, and so on; but this is an account of the British Medical Association's Annual Meeting.

The Association Meeting began on the 21st of July, but during the first four days its deliberations were confined to members of the Representative Body. Such important things as medical services for the nation, diphtheria immunization (lagging somewhat in the British Isles), medical aspects of A.R.P. (air raid precaution) were discussed. For the rank and file of delegates the convention got under way on Tuesday night, July 25th, when the Annual Meeting of the Association was held and the President's address delivered. This was a colourful affair of academic robes and decorations. Delegates from kindred associations, foreign guests, and representatives from Dominions, Colonies and Dependencies were presented to the President, and various prizes awarded.

The President, Dr. Thomas Fraser, drew from his long years of experience as a practitioner in Aberdeen, a picture of rapidly changing times. He spoke of the evident improvement in the national health, of the expansion of hospital and public health services. He referred particularly to the National Health Insurance Act and to the part the British

Medical Association had played in its administration. In his opinion the Act compared favourably with other state health insurance schemes, but he stressed the opinion of the Association that it now needed change, particularly expansion. His address was delivered to a crowded audience in one of the large theatres, and on its completion the meeting adjourned to Elphinstone Hall, King's College, for a reception and a dance.

Scientific sessions began in earnest the following day and continued during the morning hours for three days. Sixteen sections held meetings, some on three days and some on two days only. Usually a topic for discussion was selected which was contributed to by a number of speakers, after which a general discussion took place. In some sessions "occasional papers", unrelated to the general topic under discussion, were introduced at the end of the period.

The session which probably created most interest, and which drew a large attendance, was the joint discussion by a number of the sections on "The present position of chemotherapy by means of drugs of the sulphanilamide group". This was in the nature of a chorus of praise from the various specialties. Even the experts in tropical medicine had something to say on the use of sulphanilamide in tropical diseases.

One of the sessions was devoted to a consideration of the future of the practice of medicine. This was attended, apparently, by delegates who were chiefly 'left wing' in their views. The official policy of the British Medical Association is to support the principle of National Health Insurance and to advocate an extension of this principle to cover a larger number of persons with a more comprehensive medical service. Free choice of physician is an important item in this policy. This official attitude is not endorsed by all the members of the Association. Those who might be termed 'left wingers' see great evils in competition among doctors. They see the triumph of the physician with a good bedside manner and the downfall of the one who lacks it, even though the latter may be better qualified than the former. This radical group want a salaried medical service. The impressive thing about all this to the overseas visitor is the interest which the rank and file of the medical profession in Britain take in medical economics.

The final session which I was able to attend was a joint session of the sections of Public Health and Hygiene and of Services and Tropical Medicine. The discussion was on leptospirosis (Weil's disease). Oddly enough, all the cases of leptospirosis which were discussed were of British origin mainly in sewer workers, coal miners and fish cleaners. The focus was thought to be infected rats, and infection either by means of cuts or by ingestion.

One cannot close this account without a word of appreciation of the hospitality shown by the citizens of Aberdeen. Perhaps Canada has a closer link with Aberdeen than other British cities, through Dr. W. H. Fyfe, formerly Principal of Queen's University, now Principal of Aberdeen University. It was my privilege to sit near him at the annual dinner of the Association and to receive a hearty welcome from him. From the Lord Provost who seemed to be always present and the ex-Lord Provost, who was equally indefatigable, to the tram-conductor, who refused all attempts at payment, everyone was kindness itself. The Civic Reception at the Art Gallery was a great success and the arrangements of the Local Committee beyond criticism.

Medical Societies

The Federation of the Medical Women of Canada

At the annual meeting of this organization, Dr. Alice Brown, of Saint John, was elected Vice-president for New Brunswick.

New Brunswick Medical Society

The 59th annual meeting of the New Brunswick Medical Society was held at St. Andrews on August 29th and 30th. Dr. W. E. Gray, President, presided at all meetings. The address of welcome to the society was read by Mr. R. R. Keay, M.L.A. for Charlotte County. The nominating committee, composed of Drs. R. A. Mackeen; A. L. Gerow, Fredericton; J. R. Nugent, Saint John; R. W. Earl, Perth and W. S. Fitzpatrick, Moncton, nominated a slate of officers which was elected as follows: *President,* Dr. R. M. Pendrigh, Saint John; *First Vice-president,* Dr. Charles Dumont, Campbellton; *Second Vice-President, Dr. Arthur VanWart,* Fredericton; *Secretary,* Dr. A. S. Kirkland, Saint John; *Treasurer,* Dr. F. C. Jennings, Saint John; *Executive Committee:* Drs. A. E. Macaulay, Saint John; J. F. L. Brown, Woodstock; J. S. Hynes, Fredericton; H. S. Everett, St. Stephen; P. M. Atkinson, Moncton; P. C. LaPorte, Madawaska; C. Langis, West Bathurst. *The Workmen's Compensation Buffer Committee:* Dr. A. L. Donovan, Chairman; Drs. G. S. Skinner and W. J. Baxter. *The Cancer Committee:* Drs. J. M. Barry, A. S. Kirkland, R. M. Pendrigh, J. S. Hynes, H. E. Britton (Chairman), Geo. Dumont. *Golf Committee:* Drs. V. D. Davidson, W. A. Warwick and W. E. Gray. *Members of the Canadian Medical Council:* Drs. R. M. Pendrigh, A. S. Kirkland, R. W. L. Earl, S. J. Veniot, H. E. Britton, A. L. Gerow, P. C. Laporte, J. R. Nugent, A. E. Macaulay.

Dr. P. C. LaPorte was elected to complete the term of his brother, Dr. Pio LaPorte, on the Council of Physicians and Surgeons for New Brunswick.

At this session of the New Brunswick Medical Society it was unanimously decided that the New Brunswick Medical Society become a division of the Canadian Medical Association, only minor details concerning by-laws now remaining to make this a completed issue.

It was decided that at the next annual meeting a scientific program be presented by New Brunswick talent exclusively. The annual meeting in 1940 will be the 60th anniversary of the foundation of the New Brunswick Medical Society, and it was felt that it should be a time for a special get-together of New Brunswick doctors.

The Society decided to cooperate with the New Brunswick Workmen's Compensation Board in an attempt to define the type of tuberculosis which should be compensable under the Workmen's Compensation Board act.

At the request of the New Brunswick Society for the Control of Cancer, the New Brunswick Medical Society appointed its own cancer committee as an advisory board to the New Brunswick Society for the Control of Cancer.

Dr. J. R. Nugent, of Saint John, was elected Grand Councillor to represent the medical profession of New Brunswick on the Canadian Society for the Control of Cancer.

The treasurer's report was read by Dr. F. C. Jennings and showed that financial affairs of the Society are in a healthy condition and that the activities of the Society continue to be economically administered.

Dr. V. D. Davidson presented the report of the Workmen's Compensation Board Buffer Committee. This report stated that relations between the profession and the Workmen's Compensation Board were more satisfactory than had been the case during several years past.

Arising out of correspondence received from the Canadian Society of Radiologists, the New Brunswick Medical Society went on record as definitely disapproving of the sale of individual professional services by any group contemplating the sale of hospitalization under group hospital plans.

Dr. G. B. Peat was granted the privilege of speaking concerning air-raid precautions and requested that all physicians would lend their aid in their local communities.

Dr. F. S. Patch, President of the Canadian Medical Association, congratulated the New Brunswick Society on completion of federation and spoke of the general outlook and future of medicine in Canada. Dr. T. C. Routley spoke shortly on the advantages of federation and suggested the advisability of a maritime conference, perhaps at Moncton, with representatives of the Canadian Medical Association head office staff, this conference to be held some time this winter. Dr. Routley also stated that the Canadian Medical Association was not unmindful of necessary planning for the utilization of medical services if and when a war were declared.

A. S. KIRKLAND,
Secretary.

St. Croix Medical Society

On August 10th the meeting of the St. Croix Medical Society was addressed by a group of speakers from Saint John. Dr. C. O. McKay spoke on "Treatment of fractures in relation to joints". Dr. R. A. Gregory spoke on "Neurological symptoms and signs of interest in general practice". Dr. W. O. McDonald discussed "Anæmias".

Saint John Medical Society

The Saint John Medical Society held its monthly meeting in the Admiral Beatty Hotel on August 8th. Dr. G. B. Peat was chairman. The meeting discussed generally a recent report on "Medical economics" presented by Dr. A. F. VanWart, Fredericton.

University Notes

Queen's University

The following appointments to the staff of Queen's University, Kingston, have been announced.

Dr. Edwin Moody Robertson, of the University of Edinburgh, has been appointed to a full-time chair of Obstetrics and Gynæcology, succeeding Dr. G. W. Mylks.

Dr. C. H. McCuaig was appointed assistant professor of medicine in charge of psychiatry. Dr. McCuaig was at one time clinical assistant in psychology at the Ontario Hospital, Kingston.

Dr. Donald Olding Hebb has been appointed to work in the new Queen's psychological laboratory in experimental psychology. Dr. Hebb was recently on the staff of McGill University and the Montreal Neurological Institute as a Rockefeller Fellow.

I avow myself the partisan of truth alone; and I can indeed say that I have used all my endeavours, bestowed all my pains, on an attempt to produce something that should be agreeable to the good, profitable to the learned, and useful to letter.—*William Harvey.*

Letters, Notes and Queries

Genital Anomalies

To the Editor:

Reading the report by Drs. Grieve and McDermott of two consecutive brothers with congenital atresia of the œsophagus recalls an experience I had some years ago with congenital anomalies.

On November 15, 1928, I attended a Canadian-born Polish woman, in labour for the first time. She was delivered of a healthy male child of about seven pounds weight. The baby had hypospadias and complete absence of the foreskin, the urethra opening at the frenum just behind the glans penis. As this did not promise much of a handicap, no effort was made to repair the urethra. On March 9, 1930, I again delivered this woman of a child in every way healthy and normal except for the complete absence of foreskin. In this case the urethra passed through the glans and ended in a normal meatus. Subsequent children of this mother have all been girls.

ISAAC E. CRACK.

Hamilton, Ont.,
August 9, 1939.

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

Medico-Legal

Annual Report of the Canadian Medical Protective Association

For the first time the Council of the Canadian Medical Protective Association is leaving all strictly legal business to be reported by its General Counsel. Matters affecting the relationship between the Association and its members have arisen so often during the year that it was felt they should be dealt with this year to the exclusion of other matters.

With the growth of the Association we have been surprised to notice a corresponding increase in the number of unusual things which can be done by members, things which prejudice their own best interests. The Association has always requested, and lately has been insisting, and in the future must insist more strongly than ever, that members communicate with the Association as soon as a threat is received. Not a few members answer threats and take action which serves to complicate cases before they let the Association know they are in any trouble. Once or twice cases have progressed to the place where writs have been issued before notification was sent the Association, and naturally at that stage our members are in great haste for some immediate action which, for reasons just as natural, the Association cannot take charge of without full information. Members should under no circumstances answer threats without first obtaining advice from the Association. For this there are two reasons. It is in the members' own best interests, and it is in the best interest of the Association. Most threats against doctors are made in the hope that the doctors can be frightened into waiving payment of accounts, or with the hope that they can be frightened into paying the complainants to stop threatening. As far as our experience enables us to judge most doctors react to threats by long, more or less involved, explanations. It is bad enough when an explanation is verbal and a patient has to quote from memory remarks made by the doctor which, he thinks, support his arguments, but it is worse when a doctor writes a long, often rambling, letter which invariably contains statements that, wrenched from their context, may be used against the author. Do not write anything. Do not reply to threats at all without consulting the Association. This danger of talking too much is not abstract; it is concrete and has caused needless trouble more than once. It occurred recently and in all probability was a deciding factor, if not the most important deciding factor, in precipitating the trouble which followed the threat. After doing a prostatectomy one of our members received a lawyer's letter threatening suit because the patient said he had been sterilized by the operation. The doctor replied in an explanatory letter which ran to a whole page. His discussion of possible or probable sterilization following prostatectomy was too long, and not content with that he proceeded to enumerate other complications which the patient had suffered following his operation, complications about which the patient had not complained at all. So frank was his letter that his patient's counsel replied that in his own best interests the doctor had better communicate through counsel in the future. This doctor gave his patient a whole store of ammunition.

The best interest of the Association is also served by this plan of procedure. Advice can be given members which will tend to minimize the likelihood of suit, thereby saving the Association's funds, which, after all, are nothing but your money.

One further thing in this same connection. Do not write patients stating that you are a member of the Canadian Medical Protective Association, or that you are insured. For some reason difficult to understand some men feel that belonging to the Association or having an insurance policy removes from them any responsibility when a threat is received or a suit begun. They reply glibly that the patient should get in touch with the protective organization. This reacts in the one way that is harmful. Few doctors have money enough to pay a large judgment obtained against them. Patients know this, and

when they are considering the advisability of suit it enters into their thinking. Often it acts as a deterrent because they feel that if they did win they could not collect anything. But just as soon as they know there is an organization behind the doctor which presumably has more or less unlimited funds at its disposal they decide there is nothing to lose by suing and there may be a lot to gain. Do not forget that most suits are brought by indigents who literally have nothing to lose if the suit is unsuccessful. They cannot even pay costs. Therefore, the answer that an Association will look after the matter is actually an invitation to trouble. The Association may be embarrassed by such procedure aside altogether from the increased difficulty in preventing suits. If it is known officially that the Association is responsible for the costs of a doctor's defence it is impossible for the Association to recover costs in the event of a favourable decision. The financial loss caused by inability to recover costs is often considerable. For example, it is seldom possible to defend a case in court for less than five hundred dollars, even when the defence is successful. The only money this Association has is your money which you give us to use when any of you get into trouble. Do not act in such a way that you waste your own money.

One other point has arisen occasionally in previous years, and more frequently during the past year. Some doctors carry malpractice insurance in addition to their membership in this Association, and when they get into trouble expect joint action by both organizations. Before discussing the question of joint defence two things should be mentioned. The membership of your own Association at present comprises more than one-third of the profession in the Dominion. It is probably fair to say that this number is larger than the number belonging to all the other organizations in the Dominion, which should mean that in point of experience the Canadian Medical Protective Association is better qualified than most other organizations to defend its members. Therefore, from this point of view insurance as well as membership in the Association is unnecessary. The Association has re-insurance with one of the largest companies in the British Empire, so that it is able to assist in the payment of damages to an unlimited extent should they be assessed against a doctor. Most commercial companies, for an annual premium at least three times as great as our membership fee, offer protection to the extent of five thousand dollars only. Therefore, from the point of view of assistance offered an insurance policy as well as membership is sheer waste of money. Those points are mentioned merely in an effort to save members paying two fees each year to provide themselves with service which their own mutual organization can give without other assistance. From a practical viewpoint, two organizations cannot cooperate effectively in the defence of a doctor. Neither of them can be expected to accept responsibility for the payment of damages unless they have had control of the defence. Further, no two orginzations will choose to defend a case in exactly the same manner. It is not a question of one plan of defence being better or worse than another, simply a fact that they will be different. Under these circumstances counsel is torn between different instructions so that the conduct of the defence suffers. This occurred so often in cases in which the Association was interested that we were forced to refuse cooperation. Members who request this are told that they must choose at once whether they will be defended by us or by the other organization, and then they must depend on the organization of their choice. So, from this point of view, insurance as well as membership in your own Association is a waste of money.

Members should bear in mind a fact of wider application. The Canadian Medical Protective Association has one, and only one, reason for existence—to assist its members when they need help. The provision of this help in its most effective form demands that it be given in a manner which will minimize the probability of like trouble for other members of the profession. To dispose of threats or suits against members by settlement involving financial considerations is harmful to the individual doctor and to the profession. One such settlement in a district increases the risk of trouble for every other doctor in the district. It must be remembered that no settlement is necessary unless a doctor admits guilt, and for settlement to be effected the doctor must have admitted guilt. This is true, in spite of any remarks to the contrary. For these reasons the Association refuses to settle any case in that way, subject of course to the exceptions arising from unusual circumstances. Patients must either withdraw suits altogether, in which case of course, settlements are unnecessary, or they must have the case decided in court where, obviously, favourable decisions eliminate the need of settlement. Only by such a course can the best interests of the individual doctor be served as well as the best interests of the profession as a whole.

During the past year a number of our members have requested representation by counsel at inquests. Generally speaking the Association does not supply counsel at inquests. An inquest is merely an inquiry to ascertain the facts and is in no sense a trial. The fact that a doctor is represented by counsel at an inquest may react unfavourably on him by suggesting that he has something to conceal or that he has some special reason to fear the facts. Therefore, members should be prepared to go to inquests without counsel and should answer questions fully and frankly. If the facts brought out at the inquest are such that further action will be

taken in which the doctor may be implicated the Association will do whatever is necessary for its member.

Your Council, in completing its report, wishes to thank those members who have sent early notification of possible suits. Actually the number is increasing; more and more members write as soon as patients intimate that their dissatisfaction may be followed by other action. Your Council wishes to thank those members of the Provincial Executives, literally from Halifax to Victoria, who have assisted in the work during the year. The Council endeavours to bother them as little as possible, but is grateful for prompt cooperation on many occasions.

J. FENTON ARGUE, M.D.,
Montreal, June 22, 1939. *President.*

The Canadian Medical Protective Association

May 26, 1939.

Dr. T. L. Fisher, Secretary,
Canadian Medical Protective Association,
Medical Arts Building, Ottawa, Ont.

Dear Sir:—

As General Counsel for your Association I have the honour to submit my report.

During the past year your Association has advised twenty-four of its members who apprehended suit and twenty-eight others who were actually threatened. In nine cases writs were issued, and in three cases which went to trial we were successful in our defence.

In one of these defences, a Saskatchewan case, the plaintiff secured judgment by consent against the hospital which had also been sued and a condition of this judgment was the payment of our costs on a party and party basis and this was duly carried out.

In the case of our other two members who were obliged to go to trial in Vancouver the action was brought against them upon allegations of malpractice arising out of their treatment of a fractured left femur. It was suggested that their treatment had resulted in unnecessary shortening and that the leg was permitted to heal out of alignment. The trial lasted more than two days before the plaintiff's counsel stopped proceedings and announced to the Court that after hearing the evidence adduced he wished to withdraw the charges of negligence made against the defendants. The trial judge then stated that he had listened to the evidence carefully for two days and that he felt that it was coming to the defendants for him to state publicly that he was satisfied that both defendants had done everything possible for the infant plaintiff, and that the evidence showed conclusively that there was no negligence on the part of either of them. He therefore dismissed the action with costs.

In two cases the circumstances were such that your counsel and his associates, locally retained, recommended that a settlement should be made, and, in the result, your Council concurred.

The circumstances of the first of these two cases which arose in northern Quebec were briefly as follows. Our member applied a plaster of Paris cast to the plaintiff's left arm for a Colles fracture. No x-ray examination was made before or after the cast was applied and, in the result, our member neglected to see the patient for several days after he had treated her. Gangrene of all the fingers occurred and they had to be amputated. The more the facts of this case were investigated the more apparent it became that the outcome would be adverse and the award of damages very heavy. It was finally settled by payment of $4,000 to the plaintiff and $600 costs to her lawyers.

In the other of the two cases settled our member had left an abdominal spatula in the abdomen of his patient and its presence was not discovered for months. There was no suggestion of difficulty about the operation, precarious condition of the patient, or urgency of the operation.

Our member had no explanation to offer, and it was apparent that nothing could be expected from him to successfully meet the plaintiff's claim of malpractice, and he felt very keenly that the responsibility was his for what had occurred and that a settlement out of Court was essential. As your counsel and your Council were satisfied of the importance of making an effort to settle this claim an offer of $2,000 was approved to the plaintiff and $400 for lawyer's fees. While this offer was still under consideration by the plaintiff our member, on his own responsibility and in spite of our advice, offered another $2,000 of his own money to the plaintiff direct. In all the circumstances it was decided to let the settlement be made on the basis of $4,000 and $400 costs which represented to the Association no more than the original amount approved, which was a great deal less than we would have been obliged to pay on the judgment that would almost certainly have been given at the trial against our member.

In my last annual report I referred to an appeal which was taken to the Supreme Court of Canada from a decision of the Court of King's Bench (Appeal Side) of the Province of Quebec. This appeal was argued in due course and we are now awaiting the decision which we have reason to hope may be favourable to our contentions.

We are awaiting with much interest a decision by the House of Lords in a pending appeal which raises squarely the liability of a surgeon who overlooks a sponge in the course of an operation. The majority of the English Court of Appeal stated dogmatically that the principle of *res ipsa loquitur* has no application to a case of this kind, and that "some positive evidence of neglect is surely needed".

This statement is based on the view that in a surgical operation many considerations enter, such as the condition of the patient, the effects of the anæsthetic, the nature of the assistance afforded the surgeon, etc., and further says, that in view of the various combinations of circumstances a state of things may arise "of which the ordinary experience of mankind knows nothing." It was suggested that an ordinary judge had not sufficient knowledge of a surgical operation to draw a proper and natural inference from the mere presence of a sponge, since he could not say that its presence "in the ordinary course of things" implied negligence. In the Court of Appeal's opinion it must be part of the plaintiff's case to show by expert evidence of medical men the standard of care required in such a case and apparently some indication of the manner in which the defendant failed to live up to that standard.

During last summer, a leading obstetric surgeon and gynæcologist in London, England, was prosecuted on an indictment charging him with unlawfully using an instrument with intent to procure the miscarriage of a girl who had been assaulted by soldiers. The case was a test one and the Crown contended that the law did not go beyond saying that it was not unlawful to use an instrument to procure a miscarriage if such an operation was performed to save a mother's life. The surgeon's defence was that he performed the operation because there was danger to the girl's health if the child had been born. He said he could not draw a line between danger to life and danger to health and in his defence he was supported by the evidence of leaders in the profession.

The jury found him not guilty and the verdict was generally welcomed by the profession, the public, and the press of Great Britain as a reasonable finding of what the law intends.

All of which is respectfully submitted.

(Sgd.) EDMUND F. NEWCOMBE,
General Counsel.

Topics of Current Interest

Risks of Intranasal Medication

The last few years have seen an increased use by the public—often without medical supervision—of "drops" for the nose. The dangers of lipoid pneumonia after intranasal instillation of various oily preparations have already been referred to in these columns,* and questions are still asked about them. T. E. Walsh and P. R. Cannon† attempt an answer to two problems: Do any of the intranasal medicaments do any good? and, Can they do any harm? It is clearly difficult to answer the first as accurately as the second. Nevertheless in a series of experiments designed to test the antiseptic properties of eight popular remedies used intranasally they found only one—1 per cent thymol—which had any appreciable bactericidal effect, but unfortunately thymol interferes with ciliary action. Among wished-for effects removal of nasal obstruction is one of the most sought after, and the problem is to find a remedy which is harmless to the nasal mucosa and to ciliary action. In this respect weak saline solutions of ephedrine appeared to be best. Adrenaline in the usual strength of 1 in 1,000 caused immediate cessation of ciliary action. The authors found that not only were all of the oils commonly used as nasal "drops" capable of causing serious changes in the lungs but there was also the risk that pathogenic micro-organisms in the upper respiratory tract might be carried into the lungs and into an area of decreased resistance induced by the chemical agent. This risk would seem to be particularly great in infants and young children in bed, but it is by no means confined to this age group. Of the three new cases of lipoid aspiration in adults which are reported by Walsh and Cannon two were in good health and leading active lives. It is clear that the use of nasal medicaments without adequate medical supervision may be dangerous. Walsh and Cannon investigated the action of a silver protein preparation of which the manufacturers state that it is "non-toxic, definitely bactericidal, and, above all, it is markedly soothing to inflamed tissues". They found, on the contrary, that the solution was exceedingly toxic to the pulmonary tissues of normal healthy rabbits, that it had no antiseptic effect upon purulent material from the bronchiectatic cavity of a human patient (although 1 per cent thymol did), and that it caused not a soothing effect but necrosis of normal pulmonary tissue of rabbits. It is reasonable to suppose that such experimental evidence has some direct application to the human subject. The conclusion follows that an attempt to produce antiseptic or astringent effects in the nose with any of the liquids now in use is fraught with danger, but that the weak solutions of ephedrine (½ per cent in normal saline) already mentioned are the only ones which should justifiably be used to produce vasoconstriction, since these alone neither damage ciliary action nor interfere with the flow of mucus.—*Brit. M. J.*, 1939, **1**: 343.

* *Brit. M. J.*, 1938, **1**: 1112.
† *Ann. Otol. Rhinol. Laryngol.*, 1938, **47**: 579.

American Medical Association Indictment Quashed!

Justice James M. Proctor, upholding a defense demurrer to indictments, ruled on July 26th that the American Medical Association and its fellow defendants were not engaged in a trade as defined by the antimonopoly statutes. Counsel for the doctors had contended their activities could not be governed by the Anti-

trust Law, that they were engaged in a "learned profession" rather than a trade. On December 20, 1938, a District of Columbia Grand Jury, acting on evidence presented by the Justice Department, indicted the American Medical Association, the Medical Society of the District of Columbia, the Washington Academy of Surgery, the Harris County (Texas) Medical Society, and twenty-one individual physicians for violation of the Sherman Antitrust Law. These organizations and individuals, the indictment read, were "engaged in a continuing combination in conspiracy in restraint" of trade in hampering the activities of Group Health Association, Inc., for the District of Columbia, an organization established in 1937 to hire physicians and nurses and provide hospital care on a cooperative basis to government employees. Defense attorneys had contended that all their clients' activities were directed solely at the maintenance of the ethics and standards of the profession.

At the headquarters of the American Medical Association, officials, including Dr. Olin West, Secretary, and Dr. Morris Fishbein, Editor, said:

"The principles and policies of the American Medical Association do not forbid nor have they ever contemplated any opposition to a well considered expanded program of medical service, when the need can be established; neither is there any fundamental principle or policy which in any manner opposes aid to the indigent when indigence can be established.

"The American Medical Association has always welcomed investigation by any authorized agency of the nature of its organization or of the conduct of its work or of its activities, firmly reliant in the belief that every action taken by the Association has been in accordance with its constitutional organization in the interests of the public welfare for advancing standards and quality of medical service for the American people; and that at no time has it violated the established law of the federal, state, or municipal governments of this country. Moreover, by the very nature of its organization, it has preserved constantly the democratic principles on which the Government of the United States is founded and maintained."

ARTERIAL HYPERTENSION.—The authors claim to have been the first to perform nephro-omentopexy in human beings, and they describe their two cases, one a man of 47 and the other a woman of 51. The operation was unilateral in both cases, but the authors are convinced that better results would be obtained by operating on both sides in every case. They consider it to be a simple and safe method which might with advantage be extended to other organs in which ischæmia appears to be the principal morbid factor.—Abrami, P., Iselin, M. and Wallich, R.: *Presse Médicale*, 1939, **47**: 127.

Abstracts from Current Literature

Surgery

Resection of the Carcinomatous Rectosigmoid Juncture. Arnold, H. R.: *Arch. Surg.*, 1939, **38**: 1004.

The author has developed an operation for the removal of the carcinomatous rectosigmoid and a re-establishment of the continuity of the bowel, leaving the patient with a normal anus. The technique is not new but is a continuation of well known procedures, the rectosigmoid being resected in a one-stage abdomino-sacral operation, and continuity of the sigmoid flexure and the rectum being re-established (by means of the Mikulicz technique) immediately below the sacrum. Crushing clamps are left in the proximal and distal ends of the bowel, to be removed in about forty-eight hours, after which, a few days later, right-angled clamps are applied to cut through the septum. He describes the operation in detail. His method is also applicable to patients with tumour of the lower portion of the sigmoid flexure and too low to be resected from above with anastomosis of the bowel. Any disadvantage the method may have is overshadowed by the great advantage of a naturally situated anus. G. E. LEARMONTH

Volkman's Contracture as a Complication of Fractures of the Forearm and Elbow. Garber, J. N.: *J. Bone & Joint Surg.*, 1939, **21**: 154.

There are few available reports on this contracture following injury of these regions. In the few which have been perused the incidence with forearm fractures was 34 per cent, whilst in the upper extremity as a whole it ranged from 15 to 30 per cent. The purpose of this paper was to stress the importance of Volkman's contracture as a complication; to suggest a classification of circulatory disturbances which may follow these fractures, and finally to discuss theories of the mechanism by means of which the contracture occurs. The author has studied 80 cases of forearm fractures from the Royal Infirmary, Manchester, and 9 cases of Volkman's contracture. In all of these 80 cases there was no history of pre-operative circulatory or sensory or motor disturbance. He groups the circulatory disturbances which occurred in 3 classes, A, B, and Volkman's contracture. Class A had marked swelling of the fingers, brisk and pink nail-bed circulation, no spontaneous pain or limitation of movement, or pain on extension of fingers; 18 of the 80 had this disturbance after operation and it was promptly relieved by loosening or bi-valving the splint, with no after-effects. Class B had the finger-swelling, brisk nail-bed circulation, occasional slight pain in the middle-third of the forearm persisting for 4 to 5 days, and fixed moderate flexion with full voluntary flexion, but with moderate pain in the mid-third

of the forearm on passive or active extension of the fingers persisting for 3 to 4 days and disappearing within 3 weeks; 10 of the 80 had this. In Class A 14 occurred in the upper two-thirds, 4 in the lower third. In Class B 6 occurred in the upper two-thirds, 4 in the lower one-third. Nine cases of Volkman's contracture occurred in the 80, one of them before operation. Garber believes all cases occurred as a result of impaired venous return brought about by pressure from extravasated blood into the muscle and the inelasticity of its sheath, so that compression or spasm of the arteries (either radial, ulnar or interosseous or their muscular branches) occurs. Death of the muscle occurs if the muscles have been deprived of blood for 8 to 12 hours: the end-result of this is fibrosis in the muscle-cell and around the muscle fibre and the entire muscle, with later involvement of the nerves and vessel trunks. The reaction of the tissues seen at operation (in one instance 72 hours after reduction) was distinctly that of the acute inflammatory type. The region involved is usually the musculo-tendinous junction. The muscles usually involved are flexor digitorum profundus, flexor digitorum sublimis, flexor pollicis longus and pronator teres and quadratus. The median nerve is in the most susceptible position, next the ulnar, and finally, but rarely, the radial. There is always the possibility that the median nerve may be injured by bony fragments, particularly in the supracondylar region, but if complete or partial careful examination will distinguish this injury before operation; the partial may become complete as a result of the healing process. Other authors have mentioned the possibility of arterial compression or spasm as a causal factor, but this pathological study of early post-traumatic material places emphasis on the increase in intra- and extra-muscular tension, primarily traumatic, and the increase of tension coincident upon impaired venous return. There are two phases in this, the collection of blood in the venules and capillaries and the later stretching of the vascular bed and tissue œdema. Classes A and B are relieved by removal of the immobilizing apparatus. If voluntary finger motion is still markedly restricted, if severe pain persists for two hours after removal, if passive or active extension of the fingers is productive of severe pain in the swollen mid-third of the forearm, if the fingers remain numb but painful and sensitive on touch immediate operation must be done. The aponeurotic sheaths of the flexor muscles should be opened to relieve tension, and for inspection of the median and ulnar nerves, the brachial artery and its main branches, with release of compression on these. A rubber drain for 24 hours and simple skin suture complete the procedure. After 24 hours it is usually too late to prevent partial contracture.

FRANK DORRANCE

Obstetrics and Gynæcology

The Position of Total Hysterectomy in the Treatment of Benign and Malignant Conditions of the Uterus. Counsellor, V. S.: *Am. J. Obst. & Gyn.*, 1939, **37**: 217.

The uterine cervix is generally not normal in cases of leiomyoma of the fundus of the uterus, particularly if the patients have had children. It also is difficult to estimate what cervices will remain free from infection subsequent to a subtotal abdominal hysterectomy. An infected cervical stump not uncommonly is the direct focus of infection in arthritis of the small joints, and in iritis, choroiditis, and myositis. It is difficult and frequently impossible to support a prolapsed or elongated cervix properly at the time a subtotal hysterectomy is done. In metritis and chronic pelvic inflammatory disease caused by low-grade streptococcal infection a diffuse pelvic cellulitis often occurs following a subtotal hysterectomy, but is rarely a complication after total hysterectomy.

Ninety per cent of the carcinomas of the fundus are adequately managed by total abdominal hysterectomy alone or combined with irradiation. Operation will be contraindicated in a small group of cases as a result of other physical disabilities. In a very few cases of carcinoma of the cervix the Wertheim type of hysterectomy may be employed; these are cases in which the grade of malignancy is low and the patients are seen early in the course of the disease.

Total abdominal hysterectomy should be given greater consideration in the management of operable malignant lesions of the adnexa, and if the grade of malignancy is 2 or higher irradiation should be employed subsequently.

ROSS MITCHELL

Biological Pregnancy Diagnosis Tests. Crew, F. A. E.: *Brit. M. J.*, 1939, **1**: 766.

The method of injecting the "clawed toad" of South Africa (*Xenopus lævis*), the housing of the toad, and possible danger to the toad from the prepared urine are discussed. Results of tests have been compared with the Ascheim-Zondek method. It appears that under the conditions existing in the Pregnancy Diagnosis Laboratory in Edinburgh the toad can be as trustworthy as the mouse or rabbit when the specimen is properly prepared. Such preparation is undoubtedly much more expensive in time and money than is that required by the Friedman and the Ascheim-Zondek, but the actual expense can be considerably reduced by redistillation of the acetone.

The toad can certainly replace the rabbit in these tests. It can give a trustworthy positive result within 6 to 15 hours, as compared with the 24 to 48 hours of the rabbit. The toad is better than the rabbit for use in those cases in which a definite positive or an emphatic nega-

tive is the answer to the question asked, and especially when the result is urgently required. With the present methods of preparation, however, the toad does not give the graded results yielded by the mouse. It may be shown later that differences in the number of eggs extruded are indeed true reflections of corresponding differences in hormone concentration, but for the present the mouse must be retained.

It is proposed to name the biological pregnancy test in which *Xenopus lævis* is used the Hogben test. The Hogben test can at once replace the Friedman but not the Ascheim-Zondek test. ROSS MITCHELL

The Induction of Labour. Wise, E. C.: *Brit. M. J.*, 1939, **1**: 665.

The method employed was carried out in the following stages: (1) a course of early continuous premedication with sulphate of quinine; (2) preliminary admission to hospital; (3) the use of castor oil and an increase in quinine medication; (4) artificial rupture of the membranes followed by an immediate and deliberate expulsion of liquor amnii. This method was employed in a series of 287 cases. Labour was not appreciably prolonged, the number of instrumental deliveries was not increased, nor was fetal mortality increased. Providing full antiseptic and aseptic precautions are taken the risk of sepsis is very small. ROSS MITCHELL

Pædiatrics

Infantile Diarrhœa. Smellie, J. M.: Ingleby Lectures, *The Lancet*, 1939, **1**: 1026.

In the concluding section on treatment the author discusses in some detail the disordered metabolism of infants and its correction. Adequate maintainance of body fluids in any case showing clinical signs of dehydration will require an intake of 3½ to 4 ounces per lb. body weight per day. He considers that there is danger of overloading the blood with sodium chloride, and thus taxing a kidney already damaged by toxæmia. Thus a solution of half strength normal saline is preferred. Added glucose should not be stronger than 5 per cent, as failure of absorption due to increased peristalsis may allow unabsorbed glucose to undergo fermentation and the diarrhœa will be aggravated. Experiments suggest that mixed sugars are more readily absorbed than a single sugar and so Horlick's Malted Milk, or Mead's Dextrimaltose are recommended. If oral fluid is not retained subcutaneous injection of normal saline is advocated. If the continuous drip method is used 20 to 30 c.c. per hour is the rate recommended, and the total should not exceed 1 pint in 24 hours. The dangers of continuous intravenous medication in infancy result from too great a quantity and too rapid administration, and broncho-pneumonia is liable to supervene in any infant who is immobilized. Blood transfusions are indicated in those infants suffering from true anæmia. In some cases where there is toxæmia and increased blood concentration due to dehydration, blood plasma transfusions are recommended.

As regards feeding. the preliminary period of starvation during which the child receives only water, glucose and salt for 24 hours is recommended. When feeding is begun it is important that the feedings be small in quantity and dilute in quality, and advances in both directions are to be made with caution. The drugs recommended to be employed with the greatest caution are opium and belladonna, which will relieve the restlessness due to the accompanying colic.

In the discussion of Dr. Smellie's article, mention is made of the low mortality rate (25 per cent) among the partially breast-fed babies which developed enteritis, as opposed to 75 per cent in those who had never been breast-fed. Attention also is drawn to the infectivity of the disease amongst children of the same age and the high mortality rate and incidence of secondary infection in hospital cases. It is argued that by far the majority of these infants should be cared for in the home rather than sent to hospital. REGINALD A. WILSON

Oto-rhino-laryngology

Melanoma of the Nose. McKenzie, W. S.: *J. Laryngol. & Otol.*, 1939, **54**: 93.

McKenzie reports a case of the above, which was under the care of Watkin Thomas. The patient was otherwise healthy except for previous cataract, and was 72 years old. Examination of the nose showed the whole of the right nostril to be blocked by a polypoid mass, which was bluish-black in colour. The whole right side of the nose was enlarged externally. There were no palpable glands in the neck nor any evidence of metastases elsewhere. Examination of the post-nasal space showed a mass of growth, covered by slough, filling the right posterior choana. X-ray examination showed erosion of the right nasal bone and the adjacent part of the superior maxilla. The right antrum was dull, and there was some dullness in the right ethmoid region.

Deep x-ray therapy being considered unsuitable. Mr. Thomas excised the mass with diathermy, using a lateral approach, and reflecting part of the cheek with the right nostril. A large mass of growth was removed from the region of the inferior turbinate, and also from the right ethmoidal region. The posterior area of the nasal fossa and nasopharynx was full of growth also, and this was removed. The right antrum contained pus but no growth. The growth was found to originate from the right side of the nasal septum high up in the region of the superior meatus. E. A. STUART

Pathology and Experimental Medicine

Study of the Deranged Metabolism in Chronic Infectious Hepatitis. Conn, J. W., Newburgh, J. H., Johnston, M. W. and Sheldon, J. W.: *Arch. Int. Med.*, 1938, **62**: 765.

Severe injury to the liver is apt to produce hypoglycæmia. The liver performs three separate functions, representing different aspects of carbohydrate metabolism: (1) glycogenesis or storing dextrose as glycogen; (2) glycogenolysis or changing glycogen back to dextrose and setting it free in the blood; and (3) manufacturing dextrose from fats and proteins. Hypoglycæmia could be caused by a failure of (1) or (2). If glycogenolysis is at fault the liver would contain an excess of glycogen.

When the liver has been damaged by chemical poisons such as phosphorus, chloroform, arsenic, the glycogenic function is apt to fail (1 and 3). On the other hand Von Gierke's disease seems to denote a failure of (2) and excess storage. This has been explained by some as due to lack of an enzyme.

In this article destructive or degenerative lesions of the liver are given as the cause of chronic hypoglycæmia and 6 cases are reported. In the first the cause was chronic purulent cholecystitis with recovery after operation; in the second and third, also cholecystitis; fourth, carcinoma of the ampulla of Vater with biliary obstruction; fifth and sixth, cholecystitis of various types. The sugar curve went abnormally high in tolerance tests, showing poor storing ability. Thus, such a curve could be present in chronic hypoglycæmia.

Several of these patients showed macrocytosis with normal hæmoglobin and colour-index, a sign of liver damage. The glycogenic function (1 and 3) seemed to have failed in all these cases. Also the symptoms suggested hyperinsulinism, as one would expect, as shown by feelings of faintness and, in some cases, coma.

P. M. MACDONNELL

Permanent Arterial Hypertension Obtained by Section of Regulators of Pressure and its Action on Kidney. Hoerner, G., Fontaine, R. and Mandel, P.: *Arch. des Maladies du Cœur*, 1938, **31**: 1090.

Hoerner and her associates report studies on the question whether all types of arterial hypertension which present for a sufficient length of time will necessarily react on the kidneys. Experiments on dogs were carried out, producing hypertension by section of the depressor nerves by the method of C. Heymans. When this operation is performed correctly and completely it induces regularly a permanent arterial hypertension. After from 12 to 24 months have elapsed, a time judged sufficient for renal symptoms to develop, the authors tested the renal function of these dogs. The dogs retained a normal renal function. The hypertension of extrarenal origin did not influence the function of the kidney. Examination of the kidneys following unilateral nephrectomy (right) showed no lesion that could be attributed to hypertension.

S. R. TOWNSEND

Effect of Pneumothorax on the Rate of Pleural Absorption of Fluids. Maier, H. C.: *J. of Thor. Surg.*, 1939, **8**: 283.

In dogs the rate of absorption of certain fluids from the normal pleural cavity during quiet breathing was determined (1) without pneumothorax and (2) with pneumothorax, at the end of a two hour experiment. The following fluids were injected: 0.89 per cent NaCl; 0.77 per cent NaCl; and 0.25 per cent phenolsulphonephthalein in isotonic saline. In all cases the presence of air in the pleural cavity diminished markedly the rate of absorption therefrom. Deep breathing increased the rate for fluid and sodium chloride, and sometimes even offset the handicap imposed by the presence of the air.

C. C. MACKLIN

Therapeutics

Sulfapyridine in Treatment of Pneumonia, with Special Reference to Post-operative Pneumonia. Kinshaw, H. C. and Moersch, H. V.: *Arch. Surg.*, 1939, **39**: 275.

The authors record their experience with the effect of sulfapyridine on post-operative pneumonia at the Mayo Clinic. Twenty-one patients with post-operative pneumonia and 6 with primary pneumonia were treated. They usually were given 15 grains of sulfapyridine every four hours day and night. The first dose, and sometimes the second dose also, was doubled, making a total of either 105 or 120 grains during the first twenty-four hours. No seriously bad results could be attributed to the treatment. The diagnosis was confirmed by roentgen examination in every case. The maximal temperature of nearly half of the patients approached normal within twenty-four hours after beginning of the treatment with sulfapyridine. The condition of most of the remainder was significantly improved in forty-eight to seventy-two hours. The results were similar, whether or not pneumococci were found in the sputum. Post-operative pneumonia responded as well as primary pneumonia. Older patients responded as well as younger patients. Only one death occurred. Surgeons will welcome this evidence that post-operative pneumonia frequently is arrested by the administration of sulfapyridine.

G. E. LEARMONTH

2-Sulphanilyl-Amidopyridine (M and B 693) in the Treatment of Gonorrhœa. Batchelor, R. C. L., Lees, R. and Murrell, M.: *Brit. M. J.*, 1938, **2**: 1142.

One hundred and two cases of gonococcal infection treated with M and B 693 are reported.

The standard of cure is based on a minimal observation of three and a half months. Males are observed for at least a month after cessation of treatment, and during this time must show absence of discharge, clear urine, and repeated negative smears of urethral, prostatic and seminal vesicular secretions. The smears must also remain pus-free and organism-free 48 hours after a provocative intramuscular injection of 300 to 500 million organisms in a gonococcal polyvalent vaccine. The gonococcal complement fixation test must remain negative or become negative. Urethroscopic examination must show a normal lining. Female patients are observed for three months after treatment. There must be no discharge and repeated negative smears from urethral, Bartholinian and cervical secretions after menses and after vaccine as above. Bimanual examination must exclude residua in uterus and tubes.

The normal dosage is given as 2 grams daily for six days, or three daily for five days. Intensive treatment is given as 0.5 gram four-hourly the first day, 2 grams four-hourly the next two, then 1 gram the next, tapering off to 0.5 gram, the whole treatment taking 8½ days. All these developed toxic symptoms, *i.e.*, vomiting and prostration. On the normal dosage toxic symptoms were observed in 20 of the 79 adult males and in 7 of the 19 adult females. In 8 cases they were severe enough to necessitate withdrawal of the drug, but not before an average of six days, a period long enough for a favourable effect to be obtained. The incidence of toxic symptoms is tabulated as follows: headache 10, nausea 8, skin eruption 6, lassitude 4, dizziness 3, cyanosis 2, vomiting 2, breathlessness 1, diarrhœa 1 and emptiness 1. Four children, ages 5 to 10, with vulvovaginitis were treated. Three received 0.75 to 1.5 gram doses daily for 5 days and one severe case received 16 grams in 8 days. Besides the toxic symptoms enumerated above one showed a reduction in polymorphonuclear leucocytes from 64 to 41 per cent. The author summarizes his results by stating that this drug can effect a clinical cure in a large majority of gonococcal infections both of short or long duration in men and women without adjuvant treatment. Complications clear up and no complications developed during treatment. Toxic symptoms occur in less than one-third of the cases, and where normal dosage is employed these clear up on reducing the dosage, and no lasting ill effects have been encountered. The author thinks this drug is the most effective anti-gonococcal agent at present available.

ARNOLD BRANCH

Anæsthesia

Report of a Fatality Under Cyclopropane Anæsthesia. Gould, R.: *Current Researches in Anæsth. & Anal.*, 1939, **18**: 226.

The patient was a young married woman, aged 31 years, undergoing the operation of hysterectomy for a suppurating uterine fibroid. Her general condition was poor. She was pale, anæmic and toxic in appearance. The heart was dilated and the pulse rapid. The temperature varied from 98 to 100° F. No premedication was given and the operation was performed under cyclopropane alone. When the anæsthesia was deepened, to allow the peritoneum to be opened, she passed rapidly from the second to the fourth plane of anæsthesia and it was concluded that she was particularly susceptible to cyclopropane. Relaxation was ample for the operation, but there was a period of apnœa for ten minutes although the colour and pulse remained good. The patient was brought back into second plane but the respiration continued shallow. Upon deepening the anæsthesia for closing the peritoneum the period of apnœa returned and the pulse slowed to 50 per minute with occasional extrasystoles.

The oxygen was again increased, although the soda lime cannister was not cut out (which was a mistake). Still the respirations continued shallow, although there was no visible cyanosis. Finally, the mask was removed from the patient's face and she was allowed to breath pure air to hasten recovery. Almost at once she stopped breathing, the colour became dusky and then more cyanosed. An intratracheal tube was passed and the lungs inflated with oxygen. Alpha lobelin was injected intravenously and coramine intramuscularly. Artificial respiration for eighty minutes did not succeed in restoring respiration although the pulse remained fairly vigorous during this time. The patient died at the end of this period.

The post-mortem revealed a heart with cloudy swelling and myocardial softening; and the liver, spleen and kidneys showed cloudy swelling and congestion. The pathologist's opinion was that "the patient's toxic condition due to the suppurating fibroid removed at operation made her more liable to shock from the anæsthetic and operation, death being due to myocardial degeneration".

This report, although helpful, did not satisfactorily explain the mode of death. It was obviously due in this case to respiratory paralysis following a prolonged period of apnœa during which such damage must have been done to the respiratory centre that not even artificial respiration for eighty minutes was sufficient to bring about recovery. In this case however, the patient was particularly susceptible to the effects of such an apnœa by reason of her toxic condition.

Experimental work performed on dogs by Robbins and Baxter show that during periods of apnœa, although the anæsthetic mixture in the bag might contain adequate oxygen, yet the arterial oxygen concentration fell rapidly. In a typical case it fell from 20 volumes per cent to 2 volumes per cent during twenty minutes' apnœa. Cardiac irregularities did not occur

under cyclopropane until the arterial concentration became so diminished during respiratory cessation that a state of severe anoxæmia developed.

If these results are applicable to man, it would appear a matter for consideration whether the current practice of inducing such apnœas in order to produce relaxation with cyclopropane should not be abandoned as too dangerous.

F. ARTHUR H. WILKINSON

Hygiene and Public Health

End-Result of a Tuberculosis Case-Finding Project. Novak, J. B. and Kruglick, J. S.: *J. Am. M. Ass.*, 1939, **112**: 1452.

The authors wonder whether in our zeal to find new cases of tuberculosis we may not neglect those already discovered. From 1933 to 1936 they found 65 cases of tuberculosis in Chicago High School students. Forty-five of these were diagnosed as suspected or incipient, 19 as moderately advanced, and 1 as far advanced. A follow-up study was made in 1937 and 1938, when it was found that 7 of these patients had died, of whom 6 had been diagnosed as incipient cases when discovered. In addition 8 of the incipient cases had advanced to a more serious stage, while 19 of the 20 cases, initially diagnosed as advanced, appeared to have held their own. The authors believe that there is a tendency to minimize the seriousness of incipient tuberculosis both on the part of the patient and the physician, and to fail to initiate treatment or to apply adequate follow-up methods. They also feel that much more care should be taken with those having positive tuberculin reactions and negative x-rays and they instance two such patients who died of tuberculosis within two years of being declared healthy.

FRANK G. PEDLEY

Studies on Oxyuriasis: XIX. Examinations of Children in a Private Nursery School Over an 18-Month Period. Cram, E. B. and Nolan, M. O.: *Public Health Rep.*, 1939, **54**: 567.

In a modern well-equipped nursery school serving children of a fairly high social-economic class in Washington, D.C., an investigation relative to the incidence of pin-worm infestation was conducted. Details of the method of examination are given, and it is stated that the results rather under-estimated than over-estimated the incidence.

The children comprised two groups, the first (106 in number) consisting of those who were in school during 1937, and the second (25 in number) consisting of those who entered school in 1938 after control measures had been instituted. Fifty-five per cent of the first group showed evidences of pin-worm infestation at some time during the period. Only 2 of the 25 children entering the school after control measures had begun were positive. The control measures used are not discussed, but appear to have been reasonably effective, since a substantial decline in the incidence of infestation occurred towards the end of the period under investigation.

FRANK G. PEDLEY

Obituaries

Dr. William Herbert Aykroyd, a medical practitioner in Canada and the United States for many years, died suddenly on August 30, 1939, at the Toronto General Hospital, aged seventy.

Dr. Aykroyd belonged to United Empire Loyalist stock and was born on the old Aykroyd homestead at Lobrough Lake, near Kingston, Ont. He received his high school education at Sydenham and graduated in both arts and medicine from Queen's University (1903). Following his graduation, he went west and for some time was connected with the Winnipeg General Hospital. Later he interrupted his general medical practice in the west and taught school at Wainwright. He resumed his medical practice at Jacksonville, Fla., where he lived for seventeen years. At the time of his retirement four years ago he took up residence in Toronto.

Dr. William John Beatty, of Keewatin, Ont., aged seventy-three, pioneer citizen and physician, died on August 23, 1939.

Dr. Beatty was born in Avening, Ont., in 1865, and attended school there. He taught school at Glencairn, Ont., and later at Silverbrook. Graduating in medicine from Trinity University in 1896, he practised first in Collingwood, and came to western Canada in 1897 to settle in Keewatin. He bought the Beatty block in 1900 added a wing and opened the first Keewatin hospital. As tribute to his services the town council in 1935 named the park opposite the Memorial building after him.

Dr. W. R. Cameron, of Cookshire, Que., formerly of Dewittville, Que., died towards the end of July, 1939, in his fifty-first year. Dr. Cameron was a graduate of the University of Toronto in 1912. When war broke out he enlisted with the Imperial forces, serving as a captain and returning to Canada only in the spring of 1919.

Dr. Henry Robert Hay, of London, Ont., died on August 21, 1939, in his seventy-fourth year. Dr. Hay was born in Listowel, the son of the late Mr. and Mrs. Thomas E. Hay. He practised medicine in Hanover, Elmira and Wiarton, where he was the Medical Officer of Health. He was a graduate of Victoria University (1887). During the war he served overseas with the Imperial and Canadian forces, with the rank of captain. Dr. Hay's home was in Wiarton, but he had been living in London since last April.

Dr. Frank Dudley McCulloch, of Moose Jaw, Sask., died suddenly in his car on September 8, 1939, in his fortieth year. Dr. McCulloch was born in Moose Jaw and received his early education in the Victoria school and the Central Collegiate and graduated in medicine at McGill University (1925).

Dr. John William McIntosh. We report with deep regret the death, on August 12, 1939, of Dr. McIntosh, of Vancouver, who had been a very well-known figure in medical, political, and public health circles there for many years. He was sixty-nine years old. He was until a year or so ago M.H.O. of Vancouver, and was the first M.H.O. to be in charge of the Metropolitan Health Board, covering most of the lower mainland. He was a main factor in the establishment of this Board. He was a very keen enthusiast in everything he undertook. Born in Guelph, Ont., Dr.

McIntosh attended the University of Toronto (M.B., 1894) and later practised on Manitoulin Island on Lake Huron. For fourteen years he was coroner and medical superintendent of the Indians. He began practice in Vancouver as a general practitioner, somewhere about 1906, became a specialist in internal medicine and went overseas during the Great War. He came back to enter political life as M.L.A. for one of Vancouver's seats in the House (1916). Later he took up public health activities as M.H.O. for New Westminster and then became M.H.O. for Vancouver, his last active position. Dr. McIntosh "deserved well" of his country, served it long and faithfully with every faculty he possessed. He was very greatly liked and respected by all who knew him and will be missed by many.

Dr. Charles Warwick McVicar, of Winnipeg, died on August 11, 1939, aged thirty-nine. He was born in Cornwall, Ont., the son of Mr. and Mrs. T. J. McVicar, and came to western Canada with his parents when he was a boy, was educated at Winnipeg and Regina, and graduated from the Manitoba Medical College in 1923. He practised at Vanguard, Sask., for several years; took post-graduate work in London, became F.R.C.S.(Edin.) in 1934, and spent two years on the staff of the Radium Institute in Manchester. Later he was appointed radiotherapist to the Otago General Hospital in Dunedin, New Zealand. He had returned to Winnipeg in July of this year to start practice in radiotherapy.

Dr. William Diamond Sweet, of Toronto, died on August 14, 1939, aged thirty-three. He was the son of the late Archibald Sweet and Mrs. Sweet. He had been in private practice in North Toronto for the past three years and was on the staff of the Toronto Western Hospital. Dr. Sweet graduated in medicine at the University of Toronto (1931) and served his internship in Harrisburg, Pa., Toronto Western and St. Michael's Hospitals.

News Items

Great Britain

It is announced in the *Times* that an underground operating theatre, for use in war time, is being built into the foundations of a new block of buildings now under construction at the Hospital for Sick Children, Great Ormond Street, London. The underground accommodation will consist of a receiving room with eighty seats and six dressing rooms, where minor injuries can be dressed; an operating theatre for major casualties, with three tables and nine dressing and anæsthetic cubicles; a duty-room for the staff; and a sterilizing room. Electric light and water supplies are from sources independent of the main services.

Alberta

The new hospital at Claresholm has been delayed owing to the difficulty in choosing a site. That originally chosen was felt by some to be too small, but another site suggested is not so well located for drainage purposes. The approval of the Government will be necessary as to the final location.

The General Hospital in Calgary plans an extension to the nurses' home to accommodate an additional 25 nurses. It will be an advantage to both the hospital and the nurses themselves, as it will leave more room for the patients and give more rest to the nurses.

The Act designed to benefit the farmers in the settlement of their financial affairs has worked a great hardship to the medical fraternity in Alberta. Recently, the Board wrote to all creditors explaining how a bank had advanced money in order to make it possible for the farmer to carry on, and thus was entitled to get full amount advanced with interest at 5 per cent. One of the creditors was a physician who saved the man's life, *so he could carry on,* but got nothing. Another physician presented over a hundred accounts with affidavits, received partial payment on one account only—this was for $25.00. It was reduced to $1.25 which was to be paid in two payments. The first was a cheque for 62 cents, but the doctor had the consolation that the next cheque would be larger, *viz.,* 63 cents.

The Alberta Debt Adjustment Board is authorized to put certain accounts in the preferred list, so when there is a distribution of assets, the result of a year's farming; grocers' accounts, repair accounts and twine accounts are paid in full, while the physician's account for restoring the farmer so he is able to take off his crop is *not preferred,* and the physician in most cases gets nothing.

G. E. LEARMONTH

British Columbia

The Annual Meeting of the British Columbia Medical Association will be held as arranged in Vancouver from September 18th to 21st, inclusive. It is unfortunately most probable that the meeting will suffer greatly as a result of the war—since many of those concerned with the program are on military duty, and will not be able to play the part they and we had hoped. But it has been decided that the best policy by far is the traditional one of "carrying on".

One change in the program will reflect the present unpleasantness. It is planned to interpolate into the program a meeting where "The rôle of the physician in time of war" will be discussed. We all want to serve and do what we can, but we know how in the last war excessive and often mis-timed zeal led to many mistaken steps. Perhaps if we listen to those qualified to tell us we may be able to avoid these.

Many men are in uniform, and more are joining up daily. Lt.-Col. L. H. Leeson, R.C.A.M.C., is now assisting the D.M.O. of Military District No. 11, and has been moved from Vancouver to Victoria. Major G. H. Clement, R.C.A.M.C., Capt. Roy Huggard, R.C.A.M.C., and others are working with their units.

The British Columbia Medical Association put on two post-graduate tours in the province during August. The first, August 5th to 10th, covered the northern area, and meetings were enthusiastically held at Prince Rupert, Prince George and elsewhere. Dr. D. E. H. Cleveland, President of the British Columbia Medical Association, Dr. Roy Huggard, and Dr. M. W. Thomas, Executive Secretary went on this tour and report very successful meetings.

The West Kootenay Medical Association held its Annual Meeting on August 28th and this was attended as part of a second tour covering the Kootenays by Dr. Cleveland and Dr. Thomas. These gentlemen then moved on to Spokane, Wash., U.S.A., to attend the Golden Jubilee Meeting of the Washington State Medical Association. Here, after the formal proceedings, they attended a very impressive and largely attended garden party, of which, "with the appurtenances thereof", they are still talking to envious listeners.

The Northern Pacific Medical Internists' Association held its meeting in Vancouver during August. Drs. C. H. Vrooman, H. A. DesBrisay and G. F. Strong, amongst others, attended the meeting.

J. H. MACDERMOT

Manitoba

The Thirty-ninth Annual Meeting of the Canadian Tuberculosis Association was held in the Royal Alexandra Hotel in Winnipeg on September 7th, 8th, and 9th. At the business meeting Dr. R. J. Collins turned over the presidential duties to Mr. John McEachern, of Winnipeg. The visiting speakers included Dr. Erik Hedvall, University of Lund Tuberculosis Clinic, Lund, Sweden; Dr. Thomas J. Kinsella, Minneapolis; Dr. J. A. Myers, University of Minnesota; Dr. P. W. Hardie, Hamilton; Dr. H. C. Boughton, Saskatoon; Dr. C. D. Shaver, St. Catharines; Dr. Lasalle Laberge, Quebec; Dr. L. W. Thompson, Weston; Dr. G. S. Jeffrey, and Dr. D. C. Marlatt, Fort William; Dr. P. M. Andrus, London, Ont.; Dr. H. A. Jones, Tranquille, B.C.; Dr. R. G. Ferguson, Fort Qu'Appelle; Dr. Harry C. Ballon, Dr. Albert Guernon, Dr. J. A. Jarry, Dr. Gaeton Jarry and Dr. Hugh E. Burke, Montreal; Dr. Percy Moore, Ottawa; Dr. W. L. Falconer, Pas Reserve, Man.; Dr. A. B. Symes, Qu'Appelle Indian Health Unit, Sask.; and Mr. W. P. Shahan, Executive Secretary, Illinois Tuberculosis Association. Local speakers were Dr. A. P. MacKinnon and Dr. J. D. Adamson.

Dr. J. D. Adamson, of Winnipeg, presented a resolution "that the Association is ready to cooperate in any possible way with the federal government; that every soldier should be thoroughly examined by x-ray so that no active case of tuberculosis would be able to enlist with the Canadian army." This was listed as one of the greatest problems of the last war, costing the government millions in treatments and pensions.

The Dominion government was congratulated upon efforts to eradicate tuberculosis in the Indian population, and it was suggested that the work be not interrupted because of the present international situation.

At the Annual Dinner on September 8th His Honour, W. J. Tupper, K.C., Lieutenant-Governor of Manitoba, and Mayor John Queen, of Winnipeg, gave addresses of welcome. Dr. R. J. Collins gave the presidential address and the guest speaker was Mr. E. K. Williams, K.C., Winnipeg.

Construction was started at the end of August on the new Johnson Memorial Hospital at Gimli, which will be operated by the Benedictine Sisters. The new hospital will be 72 x 44 feet, and will have accommodation for 25 beds and provision for an additional 12 beds. The building was designed by Archbishop Sinnott, of Winnipeg, and is being built under his personal supervision.

In honour of Dr. W. J. Wood who will leave Lac du Bonnet shortly to become Bacteriologist for the City of Winnipeg Health Department a farewell gathering took place in the Community Hall, Lac du Bonnet. Guests from Pine Falls, Great Falls, Pinawa and other points were present to pay their respects to Dr. and Mrs. Wood who have lived in the community for fifty years. They were presented with a tea wagon.

Dr. J. R. Davidson, of Winnipeg, read a paper entitled "Variations of the resistance of mice to the development of tar carcinoma by selective breeding and diet" on September 13th before the International Congress of Cancer at Atlantic City. The Congress met under the presidency of Professor Francis Carter Wood of Columbia University.

ROSS MITCHELL

New Brunswick

The Lieutenant-Governor of New Brunswick, the Hon. Murray MacLaren, M.D., was involved in an automobile accident on August 27th in which he suffered major injuries, including a compound fracture of the forearm and a fracture of the lower thigh as well as several less serious fractures and contusions. He has been operated upon successfully for the fracture of the thigh and is showing continued improvement.

On mobilization a number of medical officers throughout New Brunswick were called on for duty and made a magnificent response. The 14th Field Ambulance was mobilized and stationed in Saint John under the command of Major A. S. Kirkland, E.D.

At the regular meeting of the Council of Physicians and Surgeons of the Province of New Brunswick, held just prior to the annual meeting, Dr. A. S. Kirkland was elected to succeed Dr. Pio LaPorte as New Brunswick representative on the Dominion Medical Council. He also was elected President of the Council of Physicians and Surgeons, to succeed Dr. R. G. Duncan, recently deceased.

A. STANLEY KIRKLAND

Nova Scotia

The eighteenth Refresher Course of the Dalhousie Medical School was held at Halifax during the last week of August. Registration totalled 127, and the clinics and lectures were, as always, enthusiastically attended. Guest teachers were Dr. William R. Cubbins, Surgeon-in-Charge of the Department of Bone and Joint Diseases, Loyola University, Chicago; Dr. A. H. Gordon, Emeritus Professor of Medicine, McGill University; Dr. George Van S. Smith, Assistant Professor of Gynæcology, Harvard University Medical School. Lectures, clinics and demonstrations by the University staff rounded out the five days' course.

Dr. Cubbins, in two lectures, presented the surgery of fractures of the neck and shaft of the femur. Both in these and at his clinics he took a strong stand on the variety of therapeutic measures advocated. Internal fixation, he believes, is sound treatment for fractures of the neck of the femur, particularly in the young, but for accurate reduction and apposition the neck of the bone must be exposed by the anterior approach. In fractures of the shaft of the femur he stressed the importance of counter-weighted, "floating" splints. Where skeletal traction is used he prefers the Steinmann pin to the Kirschner wire method.

Dr. Gordon lectured on "The diagnosis of diseases with coincident enlargement of the liver and spleen", and on "The clinical aspects of migraine", giving the clear, masterly expositions all have come to expect of him. In his clinics he showed several cases illustrating his lecture matter, and also demonstrated diagnostic and therapeutic measures in arthritis, epilepsy and other fields of medicine. Dr. G. V. Smith took his listeners ably and thoroughly through the complicated maze of female sex hormones, the experimental work done, the conclusions drawn from it. In his closing lecture he considered their "limited clinical application".

A symposium on cancer was opened by Dr. N. H. Gosse, speaking on the subject in general, with a clinical discourse on cancer in the head and neck. Dr. H. K. MacDonald spoke on "Cancer of the rectum"; Dr. Alan Curry on "Cancer of the stomach"; and Dr. H. B. Atlee on "Cancer of the cervix". "The newer chemicals in medicine and surgery" was the subject of a round-table conference. At the clinico-pathological conference recent biopsy and autopsy material was discussed. The staffs of the Victoria General Hospital, the Dalhousie Clinic, and the Anatomy Department presented clinics and demonstrations.

A distinguished social event during the week was the opening of the new Dalhousie Medical-Dental Library. Dr. M. A. Curry, former Professor of Obtetrics and Gynæcology at Dalhousie, turned the key in the lock and declared open the building the medical school has for long sorely needed. It is situated on the medical campus, and follows in brick and freestone the design of the buildings there. Modern design and building materials have combined to make the

interior airy, comfortable, and remarkably quiet. The stacks are ample for years to come. The building is a most attractive workshop for student and professor.

Dr. J. Emile LeBlanc, of West Pubnico, has been awarded a gold medal by l'Academie Française in recognition of his work of promoting the study of the French language and literature amongst the Acadians. Dr. LeBlanc's efforts also were recognized by the French government in 1934.

Dr. W. R. Morse, of Lawrencetown, who has been doing research in anthropology in Tibet, attended the Dalhousie Refresher Course. Dr. Morse has spent more than 30 years in China and is now carrying on his work at Harvard. He hopes to be in a position to publish his findings within another two years.

Commemorating a battle between French and English in the pioneer days of Nova Scotia, a monument was unveiled recently at Tatamagouche, Dr. Daniel Murray officiating.

Dr. David Morris (Dal. '37) has been transferred to Singapore as medical officer to one of the Punjab Indian Regiments.

ARTHUR L. MURPHY

Ontario

Dr. Arthur Manning Doyle, of the mental health clinic of the Ontario Hospital, Kingston, has been awarded a fellowship by the Rockefeller Foundation. After a year's study in Boston he will return to continue his work at the clinic and at Queen's University.

The Hon. H. P. Fitzsimmons, Minister of Health in New South Wales and youngest member of the cabinet, visited Toronto this summer with the object of inspecting and reporting upon hospitals. He was particularly interested in private and semi-private hospital accommodation.

Some 400 patients, most of them from the Orillia Hospital, are being moved into the new children's unit of the Ontario Mental Hospital at Woodstock.

It is announced from Hamilton that a 66 year old woman, said to be a part time cook in the cafeteria of a large factory, is being held in isolation by the health authorities as a suspected typhoid carrier.

Windsor Medical Services Incorporated seems to be making rapid progress in Ontario. It was announced early in September that within six weeks of the inauguration of Windsor Medical Services, Inc. more than 1,000 persons were utilizing the service, with a prospect of from ten to fifteen thousand within a short time.

Westminster Hospital at London, Ont., is considering undertaking the construction of a $200,000 addition.

The Sixth Biennial Congress of the International Hospital Association, which was to have been held in Toronto, September 19 to 29, 1939, has been indefinitely postponed. The outbreak of war naturally put an abrupt stop to the preparations which had been under way for over a year, thus another international effort in humanitarian affairs is sacrificed.

The Fifth Annual Meeting of the Canadian Physiological Society will be held at Queen's University, Kingston, on November 3 and 4, 1939.

In Military District Number Two (Western Ontario), the following Boards have been named to pass on recruits for militia units.

At London.—First Hussars: Col. J. L. Jepson, Major W. J. Brown, Capt. I. H. Smith, Capt. Colling. Army field workshop: Col. R. J. Gordon, Major J. C. Hunt, Lieut. C. F. Sullivan, Capt. Morrison. Royal Canadian Regiment and the 12th Field Battery: Col. W. J. McLean, Major J. C. Wilson, Capt. D. C. McFarlane, Capt. Gregory. Royal Canadian Army Service Corps: Col. S. M. Fisher, Major G. W. Aitken, Capt. L. H. Cargill and Capt. W. S. Johnston. First Division Signals and Royal Canadian Engineers: Col. H. S. Wismer, Major J. A. M. Campbell, Major V. A. Callaghan, Major McKenna.

At Walkerton and Listowel.—Ninety-seventh and 100th Batteries: Major F. G. Thompson, Major H. Hart, Lieut. R. A. Benson, Capt. W. C. Pratt, Capt. T. Sinclair.

At Windsor.—Essex Scottish Regiment: Col. Paul Poisson, Major W. G. Coulter, Major F. Adams, Lieut. D. S. Wigle, Col. A. C. Poisson, Major J. G. Campbell, Capt. J. P. Boley, Major F. A. Brockenshire.

At Stratford.—Perth Machine Gun Regiment: Major F. J. R. Forster, Capt. F. H. Nelson, Lieut. J. G. Jose, Capt. C. C. Belyea, Col. A. J. McGanity, Major D. Smith, Capt. C. C. Ballantyne, Major P. H. Spohn.

At Guelph.—Twenty-ninth Field Battery and Field Ambulance: Col. H. P. Hamilton, Capt. A. B. McCarter, Capt. R. D. Cowan, Major T. M. Savage.

J. H. ELLIOTT

Quebec

It is always the beginning of a thing that is most interesting, even if it be the beginning of a war. This applies to much of our present preparations. We had the nucleus of a very active army, but when it came to enlisting for war then something had to be done, suddenly, and in a large way.

What has taken place in Montreal is probably typical of what is going on in other large cities in Canada. On September 3rd, there was, outside the comparative few member of the C.A.M.C., no organization for the medical examination of large numbers of recruits in a short time. Less than two days later a large disused hotel had been taken over, and recruits were being examined as fast as they came in in a strong and steady stream. A force of 100 charwomen and a score of plumbers went into action in the building. There was no water and no heat and no furniture, and, too, a disused building in the heart of a big city is no rolling stone when it comes to gathering dirt. War and armies have their disadvantages, but when it comes to getting things of this kind straightened out, the results can be very striking.

All the medical examinations for this city are done in this central building, the men being sent in from their various units as they are recruited. The organization of the medical examiners has been extremely close. Under Lt.-Col. W. W. Ruddick there are fifteen boards of five men each, with Lt.-Col. Walter Smyth in charge of the boards. Each board is headed by a senior man of military experience, who is on whole-time duty, whilst the other four work half a day each. All those refused enlistment are seen by Colonel Ruddick for a final decision.

To those of us who did medical examining in 1914 there is a great deal of interest in the new organization. There still are the crowds of men standing and moving around in various states of undress, but there is much better organization and documentation.

The recruit first has his shower. That alone indicates the chasm between the methods of August, 1914, and September, 1939. One's memory of 1914 is of hot, overcrowded tents, with sweating bodies to be gone over, and the occasional parasite to be avoided. Now the shower bath is *de rigueur*. One sergeant of the old régime who brought his squad in for examination is still recovering from the shock of seeing the showers. "Hell", he was heard to mutter, "Why don't they give them bath salts."

The men then go to a room where medical orderlies take all the details of height, weight, etc. Then to the first medical officer who examines everything except the heart and lungs. In the next room another officer goes over the heart and lungs, and in the third room the president of the board categorizes the men on the findings. Three signatures are necessary on each man's papers.

Then the papers go to the checking room where there is additional enquiry as to whether the man is on pension or not. Finally, they are typed out and the recruit is handed a form on waterproof paper with his classification and notice of enlistment, which he can carry about with him. It all flows very smoothly now, but the first days and nights called for steady unrelenting labour.

It is early yet to comment on the general health of the men applying for enlistment. But so far it seems as if the chief disabilities or grounds for refusal are weakness of vision and undernourishment. In view of this it is significant that a large number of the men are from the unemployed class. H. E. MACDERMOT

Saskatchewan

Dr. J. T. Haughton, who has just completed one year's post-graduate work in the Royal Victoria Hospital, Montreal, and three years' post-graduate work at Washington University, St. Louis, Missouri, has commenced practice in association with his uncle, Dr. E. A. McCusker, and Dr. H. M. Graham. He is certified by the American Board of Otolaryngology. He will confine his practice to the specialty of ear, nose and throat.

Dr. Douglas T. Martin who has just completed one year in the Winnipeg General Hospital, and two years' post-graduate study in London, England, at Moorfields Hospital and the Central London Throat, Nose and Ear Hospital, has commenced practice in association with Dr. A. N. Hardy. While in London he took his diploma of Laryngology and Otology from the Royal College of Physicians and Surgeons of England. He will confine his practice to the diseases of the eye, ear, nose and throat.

At the August meeting of the Council of the College of Physicians and Surgeons of Saskatchewan the following were appointed as corresponding members on the Canadian Medical Association standing committees as indicated: archives, Dr. J. A. Valens, Saskatoon; cancer, Dr. E. B. Alport, Regina; constitution and by-laws, Dr. O. E. Rothwell, Regina; economics, Dr. R. G. Ferguson, Fort San; credentials and ethics, Dr. J. F. Irving, Yorkton; legislation, Dr. W. A. Dakin, Regina; maternal welfare, Dr. Lillian A. Chase, Regina; medical education, Dr. W. S. Lindsay, Saskatoon; nutrition, Dr. C. F. Bennett, Moose Jaw; pharmacy, Dr. Maurice Powers, Regina; post-graduate, Dr. Charles R. May, Regina; public health, Dr. Arthur Wilson, Saskatoon. LILLIAN A. CHASE

United States

The Annual Meeting of the Academy of Ophthalmology and Otolaryngology.—The forty-fourth annual meeting of the American Academy of Ophthalmology and Otolaryngology will be held in Chicago, October 8th to 13th, at the Palmer House. The Academy will again present its elaborate courses of instruction with more than 100 specialists as teachers; four afternoon programs of motion pictures; and a scientific exhibit in addition to its formal scientific program.

There will be one joint session at which Dr. George M. Coates, Philadelphia, will deliver his presidential address and Dr. Burt R. Shurly, Detroit, will be introduced as the Academy's guest of honour for the year and will deliver an address. At this session a symposium on essential hypertension will be presented by Drs. Albert C. Furstenberg, Ann Arbor, Mich., speaking from the standpoint of the otolaryngologist; Henry P. Wagener, Rochester, Minn., the ophthalmologist, and Roy W. Scott, Cleveland, the internist. Two foreign guests will address the section meetings, which will be held on alternate afternoons. These guests are Prof. Joseph Igersheimer, Istanbul, Turkey, who will discuss "The optic nerve and diseases of hypertension", and Arthur DeSa, Pernambuco, Brazil, who is to speak on "Ethmoiditis".

The New York Academy of Medicine announces its Twelfth Graduate Fortnight, which will take place from October 23 to November 3, 1939, at the Academy of Medicine, 2 East 103rd St., New York City. There will be morning round-table conferences, hospital clinical programs, evening sessions, and scientific exhibits. Dr. Mahlon Ashford is the Secretary of the Graduate Fortnight Committee. Those not members of the Academy are required to pay a registration fee of $5.00.

American Board of Internal Medicine, Inc.—Written examinations for certification by the American Board of Internal Medicine will be held in various sections of the United States on the third Monday in October and the third Monday in February.

Formal application must be received by the Secretary before August 20, 1939, for the October 16, 1939, examination, and on or before January 1st for the February 19, 1940, examination.

Application forms may be obtained from Dr. William S. Middleton, Secretary-Treasurer, 1301 University Avenue, Madison, Wisconsin, U.S.A.

The E. Mead Johnson Award for Research in Pædiatrics.—At the Eighth Annual Meeting of the Academy of Pædiatrics in 1938 the offer of Mead Johnson & Company to establish the E. Mead Johnson Award for Research in Pædiatrics for a period of ten years was accepted by the Academy. The committee on awards announces the following rules and regulations governing the award.

1. Two awards, one of $500 and one of $300, will be given annually at the annual meeting of the Academy of Pædiatrics.
2. The award will be made for research work published during the previous calendar year.
3. There is no limitation as to the type or scope of the research except that it be in the field of pædiatrics.
4. The award is limited to workers in the United States and Canada.
5. The award shall be limited to investigators who have been graduated not more than 15 years previous to the publication of the research.
6. There is no restriction as to the journal of publication of the research.

The Committee interprets 2 and 5 as follows:

The award in 1939 will be given for research published during the period January 1, 1938, through December 31, 1938, by a graduate of 1923 or later. The award in 1940 will be given for research published January 1, 1939, through December 31, 1939, by a graduate of 1924 or later, and so on for subsequent years.

Heads of departments and hospital services are requested to call attention to investigations meeting the requirements of the award and *in particular to research work in the field of pædiatrics published in other than pædiatric journals.* At present communications should be addressed to the chairman, Dr. Borden S. Veeder, 3720 Washington Blvd., St. Louis, Mo., U.S.A.

Classified Advertisements

MEDICAL OFFICERS FOR INSTITUTIONAL WORK WANTED.—Provincial Mental Hospital wants medical officers. Recent graduates preferred. Salary based on experience. Experience not necessary. Hospital population 1500. Applications should be addressed to the Medical Superintendent, Provincial Mental Hospital, Ponoka, Alberta.

Long established practice left vacant by doctor who joined Medical Corps. Young unmarried doctor wanted to rent office only. Apply Mrs. W. A. Kerr, Box 411, Elora, Ont.

WANTED.—Institutional position or hospital residency by young physician, graduate of Class A Medical School 1936. References. Box 331, Canadian Medical Association Journal, 3640 University Street, Montreal.

Book Reviews

Essentials of Fevers. G. E. Breen. 267 pp., illust. $2.25. Macmillan, Toronto, 1939.

In the preface to this small volume the author makes fitting reference to the fact that "practical knowledge of fevers is neither as wide nor as general as might be desired". If this statement is true of Great Britain it can be amply corroborated for Canada by those conversant with the knowledge and experience of either student or general practitioner in the recognition of the commoner, acute infectious diseases. The anomalous and rather ludicrous position in which the student finds himself with respect to the diagnosis of these diseases is well illustrated by the author's satirical but truthful estimate of the emphasis placed on these common maladies during the training of the future doctor.

The book exemplifies from cover to cover the most essential requisite for the writing of such a manual, namely, a thorough acquaintance with the clinical manifestations of each disease, by reason of ample opportunity for observation in hospital and of seeing and recording the results of the most accepted treatment.

In the early chapters on the sources and results of infection we find a careful selection of material which paves the way to a clearer understanding of the symptomatology of fevers than we have elsewhere seen.

The mechanism of immunity is explained in a comprehensive and at the same time, not too technical manner. The chapter on epidemiology, isolation and quarantine, and the conduct of isolation hospitals will more than repay the time spent in most careful perusal. The stress laid by the author on *washing of hands* is a confirmation of that classic observation of Chapin's, that, "All successful commerce is reciprocal, and in the universal trade of human saliva the fingers not only bring foreign secretions to the mouth of their owner, but there exchanging them for his own, distribute the latter to everything the hand touches."

The chapters on Scarlet Fever, Puerperal Fever, and Cerebrospinal Fever are especially deserving of careful reading and embody the latest information on diagnosis, treatment and prevention. Not more than 50 per cent of scarlet fever cases seen in this country run the course described by the writer as the *simple type*. In many cases the disease escapes the notice both of family physician and the health authorities until the desquamation is discovered by the school nurse.

It is to be regretted that less than two pages is devoted to immunization against diphtheria. The inability of health authorities and of the medical profession in Great Britain to deal with diphtheria as has been done in most communities in Canada and the United States is a grave reflection upon the otherwise outstanding achievements of medical science in Great Britain during the last century.

Clinical Pathological Gynæcology. J. T. Witherspoon. 400 pp., illust. $6.50. Lea & Febiger, Phila., 1939.

This book arose from an attempt of the author in his teaching to correlate the microscopic pathology of the female genitalia with the clinical manifestations, including etiology, treatment and prognosis of the various morbid conditions of these organs. It is not a complete textbook, and it is not offered as such, but the more common conditions which make up 95 per cent of those met in practice are described. References to original work are given at the end of each condition mentioned. Since the author believes profoundly in visual as well as in verbal teaching, the 271 illustrations form a large and important part of the work. They comprise anatomical plates and excellent reproductions from photographs and microphotographs. Further to help the reader, important words in the text are in heavy type, and a special note of praise must be sounded for the author's attempt to simplify the nomenclature of the ovarian hormones, and the various commercial preparations containing them.

Altogether it is to be heartily commended as a clear, well-written and up-to-date piece of work.

Menstrual Disorders: Pathology, Diagnosis and Treatment. C. F. Fluhmann. 316 pp., illust. $5.50. McAinsh, Toronto, 1939.

Any attempt to set forth the modern concept of the physiology of menstruation and its disorders must necessarily, owing to the advances of recent years, include full consideration of the important endocrine factors involved, both proved and supposed. Probably because of the complexity of the nomenclature hitherto employed in the literature, both scientific and commercial, the subject of the sex hormones and the endocrine control of menstruation has been an extraordinarily confused one for many medical practitioners. Yet it is essential to understand the mechanisms involved, as clearly as possible, before we can appreciate the etiological basis of many of the menstrual disorders, or institute rational endocrine therapy. The author has presented that background of the subject very reasonably, and as clearly as possible, in the present state of our knowledge. He describes also, in sufficient detail for a book of this type, the techniques of the Ascheim-Zondek, Friedman, and Allen-Doisy tests, and other laboratory procedures of importance in gynæcological investigation. In this book, the discussions of the various hormones concerned are simplified by the inclusion of lists of the commercial preparations of each type now available.

The author's classification of abnormal uterine hæmorrhage departs somewhat from some of the older ones, but each disorder is dealt with fully, under etiology, pathology, diagnosis and treatment. Because one is dealing so often with complaints of obscure or unknown etiology the treatment recommended in some sections is "directed not solely to basic causes, but also to the relief of symptoms". Endocrine therapy, where it is suggested, is given in as full detail as is at present practicable.

The volume is well illustrated with charts and microphotographs, and is pleasingly free from typographical errors.

Diathermy. Wm. Beaumont. 296 pp., illust. 10s. 6d. H. K. Lewis, London, 1939.

Here is a book of small dimensions which contains sufficient of the essentials of the electrical and clinical sides of this commercially-lauded subject to warrant its perusal by under-graduates and those in practice who have not used this method of treatment of complaints and of diseases.

The author has had extensive experience in the Westminster Hospital; he has had the desire and the opportunity to find out for himself whether the results reported by others working in this field warrant the claims made for its value. He enters sufficiently into the electrical world to allow intelligent understanding of the generators with which the neophyte is attempting to obtain relief for his patients. Although he considers the production of heat in the tissues is probably the main value received from the generators and the electrodes he carries an open mind on the electrical component as far as it may affect intracellular phenomenon and electronic activity. He gives the technique with various electrodes, local and general effects; the risks and dangers which ought to be avoided and finally discusses high frequency, short wave and inductothermy. Surely the treatment of disease by the use of electricity, in its revival of the past two decades, has advanced far beyond its earlier enthusiasm of the early 19th century; its future is uncertain, yet probably not more so than many of the present forms of therapy. This little book contains the pith of accepted theory and practice.